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Two Studies of Military Vehicle Operator Selection and Safety

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14. ABSTRACT *(Maximum 200 words)*:

The objective was to identify characteristics commanders can use to select safer drivers from among soldiers. This project involved a literature review on accident predictors, statistical analysis of soldier characteristics and accidents, testing of new measures for predicting accidents, and development of practical guidelines leaders can use to select drivers. The majority of this project focused on conducting two empirical studies. Study 1 used Project A selection, personnel, and 1983-98 U.S. Army Safety Center (USASC) accident records for 60,500 soldiers who accessed in 1986-87. Study 2 used personnel data and 1983-98 USASC accident records, combined with responses from a new 1998 data collection involving 551 soldiers. Predictors included aptitude, temperament, driving behavior, transient, and demographic variables. Predictors' relationships with eight accident criteria were analyzed: costs, injuries, fatalities, work days lost, severity, total accidents, at-fault accidents, self-report accidents, and USASC accidents. The most useful predictors included perceptual aptitude, following regulations/orders, tacit knowledge tests, use of alcohol/drugs, moving violations tickets, a rugged individualism interest profile, attitudes toward Army discipline, stress, fatigue, seatbelt use, speed, time of accident, and being on post or duty.

15. SUBJECT TERMS

Driving	Safety	Selection	Accidents
Project A	Aptitude	Temperament	

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FOREWORD

Vehicular accidents result in substantial costs to the U.S. Army in terms of injuries, fatalities, and financial expense. Privately owned vehicle (POV) accidents are the leading cause of accidental death in the Army. The U.S. Army Training and Doctrine Command tasked the U.S. Army Research Institute for the Behavioral and Social Sciences to conduct research in support of improved strategies for selecting Army drivers. The purpose of this project was to provide information based on scientific analysis to help the Army develop policies and methods to select safe drivers and provide leadership and counseling to soldiers that can help improve military driver safety. The objective was to provide information to help commanders identify soldiers who are less likely to be involved in vehicular accidents and to brief soldiers on factors that increase their likelihood of accident involvement.

This report describes two studies using samples of military drivers conducted to determine which characteristics and factors are most highly related to accident involvement and severity among soldiers. This research evaluates the relationship of stable characteristics, such as cognitive, spatial, and perceptual ability, and temperament traits, including Conscientiousness and risk taking, with accident involvement and severity. It also evaluates such factors as soldiers' performance (e.g., following regulations/orders), driving history (e.g., number of tickets), attitudes toward Army discipline, and demographic variables (e.g., sex, age, education) as predictors of accident involvement and severity. In addition, it studies the relationship of transient factors, including stress, alcohol use, speed, driving experience, and fatigue with accident criteria. This research is far more comprehensive than past studies on accident involvement, provides information based on factors specific to Army drivers, and yields practical recommendations that can be used by Army commanders to select Army drivers and inform soldiers of how to reduce their risks. In summary, this research provides useful information to help the U.S. Army in its ongoing efforts to reduce vehicular accidents, injuries, and fatalities among soldiers.

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This research required cooperation and assistance from many individuals. We would particularly like to thank Mr. Al Brown and Ms. Mary Ann Thompson, of the U.S. Army Safety Center (USASC), Ft. Rucker, AL, for their expertise and advice in obtaining and understanding the accident data necessary for conducting this research. Many thanks to Ms. Ani DiFazio (HumRRO) for helping us organize our data requests and Ms. Winnie Young for her work retrieving the military personnel data needed to complete our databases. Thanks also to Mr. Robert Fowler, formerly of HumRRO, for his assistance in managing databases for this project, Mr. Jeffrey Barnes and Ms. Pamela O'Quinn, both of HumRRO, for their expertise in developing and processing scannable forms, and Ms. Rebecca Hsu and Ms. LaVonda Murray, also of HumRRO, for their help in preparing tables and documents for this report.

Obtaining an adequate sample of soldiers to conduct the second study in this project required considerable efforts from a number of persons. We would like to thank BG Patrick O'Neal and Mr. Tom Bennett, of FORSCOM, Ft. McPherson, GA, for their help in expediting our requests for troop support. We would like to acknowledge the hard work of the data collectors who did such a great job collecting the detailed data we needed from soldiers: Mr. Daniel Martin, formerly of ARI, and Ms. Jessica Terner, Ms. Elizabeth McKenzie, Ms. Maggie Collins, Mr. Brian Katz, and Ms. Morgan Morrison of HumRRO. The following individuals were particularly helpful to us during our data collections at installations: CPT Nick Louis, formerly of Ft. Carson, CO, Mr. Chris North and SFC Duane Yarbrough, Ft. Bragg, NC, and CSM Willis McGriff, MSG George Blount, SFC Anthony Wilson, SSG Theadore Blakney, of Ft. Hood, TX.

TWO STUDIES OF MILITARY VEHICLE OPERATOR SELECTION AND SAFETY

EXECUTIVE SUMMARY

Requirements:

U.S. Army Training and Doctrine Command (TRADOC) tasked ARI to conduct a study to identify characteristics of soldiers who are most likely to be involved in accidents while operating military vehicles. The objective was to identify characteristics that Army commanders can use to select safer drivers from among soldiers in their units. Because the majority of accidental deaths in the Army are in POV accidents, we also included factors that leaders could use to inform soldiers to reduce their risks of being involved in either on- or off-duty accidents.

Procedures:

This project involved: (1) a review of the research literature on factors related to accident involvement; (2) statistical analysis of soldier characteristics and accident data already available to the Army; (3) testing of measures specifically developed or chosen for predicting accident involvement among soldiers; and (4) development of practical guidelines that Army leaders can use to select drivers. The majority of this research project focused on conducting two empirical studies.

Study 1 used existing Project A selection, Enlisted Master File (EMF), and U.S. Army Safety Center (USASC) databases to analyze relationships of aptitude, temperament, driving style, transient, demographic, and control variables with soldiers' involvement in accidents. The databases provided information on more than 60,500 soldiers who entered the Army in 1986-87. We used USASC accident records for the years 1986-98 for these soldiers and analyzed five criteria: accident involvement, total cost, severity, number of injuries, and number of fatalities. Study 2 used 1998 EMF data and 1983-98 USASC accident records combined with responses from a new 1998 data collection that had 551 enlisted Army personnel as subjects. The new data were collected with self-report instruments in classroom-type, group settings at five Army installations. This second study included the same categories of predictors (i.e., aptitude, temperament, driving style, transient, demographic, and control variables) as Study 1. Study 2 used eight accident criteria: total cost, injury, work days lost, severity, total accidents, at-fault accidents, self-report accidents, and USASC accidents.

Findings:

The major findings include:

(1) Perceptual and Psychomotor Aptitude test correct responses, a temperament measure on Dependability (i.e., nondelinquency), performance ratings on Following Regulations/Orders, Late Night Weekend Hour of the accident, and Use of Alcohol and/or Drugs while driving were consistently related to accident involvement and severity criteria in both studies. Though tested only in Study 2, the Number of Tickets soldiers have received for moving violations was also a useful predictor of Self-Report, Safety Center, Total, and Total At-Fault Accidents in all analyses.

(2) In Study 1, the Rugged Individualism interest scale was a strong predictor of accident criteria. This scale indicates that soldiers who are extremely high on interests involving thrill seeking, risk taking, and strenuous outdoor activities (e.g.., skydiving, survival skills) are higher on accident severity and cost.

(3) Results in Study 2 provided some support for the expectation that negative attitudes about driving safety, laws, and regulations would be positively related to accident involvement. High scores on the Speed Judgment test, which indicated that an individual's judgments deviated significantly from the average, were positively related with accident involvement and costs. Soldiers who agreed that offenses are forgotten quickly in the Army had more severe accidents, while those who agreed that punishment in the Army is severe or strong and punishment in the Army is appropriate had fewer accidents.

(4) Results for Study 2 also supported expectations that stress, major life changes, and fatigue are related to accident criteria. Major life events, including divorce or breakup of a relationship and having an illness or injury, and reports that one was somewhat or very stressed before an accident were related to accident involvement. Fatigue at the time of the accident was positively related to accident severity. Those who said they get higher average hours of sleep than other soldiers was positively related to accident involvement. The majority of soldiers reported getting fewer hours per sleep on average than experts recommend (i.e., eight hours of sleep per night).

(5) Several transient situational or personal factors and demographic and control variables were also predictors of criteria. Soldiers have less accident involvement and fewer severe accidents while on post and on duty. Seatbelt use has a consistent negative relationship with accident involvement and severity. Roadway, traffic, and driver speed were related to the number of accidents soldiers had. Having a hearing limitation was positively related to accident severity criteria in Study 1, but not in Study 2.

(6) Other factors were not found to be useful as predictors. Type A Subscales (i.e., competitiveness, impatience, irritability, preference for engaging in mulitple activities simultaneously) and Driving-Related Internal and External Locus of Control (i.e., whether individuals feel they can control their accident involvement or think it is due only to chance) received no support in either study. Tests of General Cognitive Aptitudes and Spatial Aptitudes received no support as predictors in Study 1 and very limited support in Study 2. Impulsivity scales could only be tested in Study 2, and the results were weak and in mixed directions. Driver Errors in Study 1 and risky Driver Behaviors in Study 2 were not clearly related to accident criteria.

Utilization of Findings:

Recommendations for making use of the results of this research for selecting drivers from among soldiers and informing soldiers of how to reduce their accident risks can be found in the Discussion section and Tables 1 through 3 near the end of the text of this report.

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A STUDY OF MILITARY VEHICLE OPERATOR SELECTION

INTRODUCTION

Research Goals

Vehicle accidents result in substantial costs to the U.S. Army in terms of injuries, fatalities, and financial expense. Privately owned vehicle (POV) accidents are the leading cause of accidental death in the Army. US Army Safety Center records for FY98 show that there was an average of two ground vehicle accidents per day, and one soldier died every 3 days in a POV accident. Ground accident military fatalities increased 21%, POV military fatalities increased 25%, and Army costs for military ground accidents increased 32% from FY97 to FY98. As of December 1, 1998, 32 soldiers had already died in FY99 ground accidents, an increase of more than 33% relative to the same period in FY98 and an increase of 28% over the average for the same period in the last 3 years (USASC, November 30, 1998). As GEN Dennis J. Reimer, Army Chief of Staff, expressed it in a March 25, 1998 memorandum on POV accidents to general officers:

> *...Positive, hands-on leadership at all levels is imperative....Leader emphasis on POV safety must be unrelenting...I want every Army leader to clearly understand the depth of my determination to end these tragic and needless POV fatalities. I cannot accept the current POV fatality trend we are experiencing.*

The Army Chief of Staff, through the U.S. Army Training and Doctrine Command (TRADOC), tasked the Army Research Institute for the Behavioral and Social Sciences (ARI) to conduct research in support of improved strategies for selecting Army drivers. The purpose of this project was to provide information based on scientific analysis to help the Army develop policies and methods to select safe drivers and provide leadership and counseling to soldiers that can help improve driver safety. More specifically, the goal was to provide tools and information to help commanders identify individuals who are less likely to be involved in vehicular accidents and to brief soldiers on factors that increase the likelihood of their involvement in accidents.

Civilian studies of variables that are related to traffic crashes point to the role of individual differences in temperament and cognitive and perceptual aptitude as potentially important predictors of vehicular accident risk. In addition, transient variables, such as stress, fatigue, and mileage driven, also have been identified as potential contributors to involvement in vehicular accidents. A significant amount of research has been done to understand the role of these variables in accidents involving the general population. However, the vast majority of this research has had a narrow topical focus and evaluated only a single type of variable or small set of variables as predictors or causes of accident involvement. In addition, results have sometimes been inconsistent, factors studied are often not of practical use to the Army, and subjects involved in the research have frequently been different from soldiers in the Army (e.g., higher proportions of older drivers or female drivers). A comprehensive study of potential predictors of accident involvement among soldiers was needed to identify information Army officers have available to them that can help them make more valid decisions for selecting drivers.

In this research we not only focus on factors that can help the Army select safer drivers, but also provide information on transient factors Army leaders can use to inform soldiers about how to reduce their risk of accident involvement. It is necessary to analyze both stable and transient factors together to accurately determine the ability to predict accident involvement and make assignment decisions. Because accident involvement is a relatively infrequent event, it has been quite difficult to predict. Including a broad range of variables should increase the ability to predict accident involvement.

The key objectives of this research were to identify (a) stable characteristics and aptitudes that predict traffic crash risk, and (b) transient variables and events that are associated with higher likelihood of accident involvement. Temperament characteristics, such as Conscientiousness, thrill seeking, impulsivity, and mild social deviance, and aptitudes, such as cognitive, spatial, perceptual, and psychomotor, can be used to help the Army identify which military personnel are most at risk of causing an accident. This information can be used in decisions to identify which individuals should be placed in positions involving extensive use of military vehicles and higher levels of exposure to vehicular accident risk. Knowledge derived from research on the relationships between transient variables and accidents (e.g., work-related and personal stress, sleep deprivation, and weather conditions) can be used to better inform soldiers of accident-related factors, counsel soldiers who have greater susceptibility to accident risk, and provide leadership to influence soldiers to reduce their risks. This information can be used to support the development of policy governing the selection and assignment of individuals to operate wheeled and tracked motor vehicles and to provide information, counseling, and leadership guidance to military personnel operating POVs.

Overview of the Research Approach

Given the short timeframe in which ARI had to respond to this tasking, the research plan made maximal use of existing data and assured that the process for collecting new data was as straightforward as possible. That is, data collections were designed to minimize the burden imposed on installations supporting the research (in terms of soldier time, coordination requirements, etc.).

Two separate studies were conducted as part of this research. Study 1 was based entirely on existing data from the USASC and a database constructed by ARI in a previous research effort. The ARI "Project A" database has scores on a variety of experimental selection and classification instruments from more than 50,000 new recruits who entered the Army during FY86-87 (Campbell & Zook, 1994). These instruments measure temperament (e.g., Conscientiousness) and spatial, perceptual, and psychomotor aptitudes, among other characteristics. By matching data from soldiers in the Project A database to USASC accident records, ARI was able to answer several research questions with minimal time, expense, and burden to Army personnel.

Although the analysis of existing data was highly informative, it was not sufficient for responding to the research questions posed. Study 2 was designed to collect additional types of data on a more current and broader sampling of soldiers. To this end, the USASC provided information on all soldiers who, over the preceding five years, had been involved as drivers in vehicular ground accidents. The USASC database provides detailed information about the

accidents. Additional data on the soldiers (e.g., Armed Services Vocational Aptitude Battery (ASVAB) scores and demographics) were retrieved from the Army's Enlisted Master Files (EMF). In addition, new data were collected by administering a battery of paper-and-pencil instruments to soldiers at several Army installations. The goal was to have approximately half of the soldiers in this sample identified as having an accident record in the USASC database, and the other half be a comparable sample of soldiers (in terms of sex, military occupational specialties (MOS), and rank) without accident records in the USASC database. The battery of instruments included tests of cognitive, spatial, and perceptual aptitude; measures of temperament, including Conscientiousness, impatience, hostility, impulsivity, locus of control, and thrill seeking; and self-report descriptions of accidents. We created a new database by merging the USASC accident records, EMF data, and newly collected test and survey data for Study 2.

Each study within this project provides different advantages. The Current Database Study (Study 1) involved a predictive design in which all predictor measures were collected before the accident criterion. Soldiers involved in the Project A data collection completed measures shortly after accession. USASC records provided information on all accidents recorded by the USASC for Project A soldiers from after they accessed until their final separation. Other key advantages of this study include the large sample and the computerized test score records from a battery of tests used to assess soldiers' perceptual and psychomotor aptitudes. A review of the literature on vehicular accident predictors suggests that these tests may be particularly useful in predicting individual soldiers' risks of accident involvement. Yet another advantage of Study 1 is that it did not require new troop support time and effort and could be conducted at minimal expense to the Army.

Study 2, the New Database Study, used a postdictive design in which predictor measures were collected after soldiers' accidents occurred, which is opposite the temporal order of interest in this research. However, because temperament and aptitude characteristics are generally considered by psychologists to be stable traits of individuals, the postdictive nature of this design is not highly problematic. An alternative predictive design in which temperament and aptitude measures are collected, and then accident data are collected for a few years after the temperament and aptitude measures, was not possible given the time constraints for conducting this research. Key advantages of this second study include the fact that we were able to select soldiers who had accidents recorded in the files of the USASC, and then select other soldiers having similar ranks and MOS, but no USASC accident records, as a comparison sample. In this way, we were able to raise the accident base rate, or the percentage of soldiers in the sample who have had accidents, thus improving our ability to detect true differences on the temperament, aptitude, and transient measures between accident-involved and non-accident-involved soldiers. Study 2 also allowed the use of instruments that focus specifically on driving-related characteristics and behaviors. For example, soldiers were asked to describe accidents in which they have been involved and the transient variables (e.g., weather conditions, stress, fatigue, age, driving experience, type of vehicle, driver training) that may have influenced their accident involvement.

It should be noted that because participants in both studies varied considerably in the length of time they served in the Army, the criterion measures used in both studies were influenced by opportunity bias. That is, those who were in the Army longer had a greater opportunity to be involved in vehicular accidents, and to have their accidents recorded by the U.S.

Army Safety Center. This methodological concern was addressed in both studies through the use of event history analyses and again in the second study by adjusting the four number of accidents criteria for the number of days the soldiers were in the Army and could have potentially had an accident.

Organization of Report

The following section describes the literature review conducted as part of this project and the specific research hypotheses that were derived from that review. Then the method and results for each of the two research studies are described in the next two sections. The report concludes with a discussion of the implications of the research results and recommendations for Army action and future research.

LITERATURE REVIEW

Overview

To determine how to best design research to identify predictors of vehicular accident involvement of soldiers, it is necessary to have a thorough understanding of prior research on factors related to accident involvement. Therefore, we conducted a review of sources of information and research on accidents and accident prevention in fields including military psychology, private business, industrial psychology, and transportation.

Much of the research on factors related to accident involvement has been limited in breadth, narrowly focusing on a single variable or type of variable believed to predict accident involvement (Elander, West, & French, 1992). This is a significant limitation, because excluding other key explanatory and control variables can distort relationships found between accident criteria and the variables that are included. A major goal of this research project was to include as comprehensive a set of explanatory variables as possible to determine which of the variables constitute an optimal predictor set. Although one variable may be significantly related to accident involvement, it may not be as highly related as a second variable or add any incremental validity (additional explanatory or predictive power). By using multivariate analyses with a broad set of predictor and control measures, different predictors can be compared and combined in composites to determine the optimal set of predictors of accident involvement.

Based on the literature review, five categories of predictor and control variables were identified for inclusion in this research. These categories, and examples of variables used for each, are as follows:

(1) Aptitude: cognitive, spatial, perceptual, and psychomotor aptitudes.
(2) Temperament: such traits as Conscientiousness, impulsivity, thrill seeking, social deviance, agreeableness, and Type A behavior pattern.
(3) Driving style: behaviors, history, attitudes, and judgment.
(4) Transient factors: stress, major life events, alcohol and drug use, driving conditions, driving experience, exposure to risk (i.e., mileage driven), and fatigue.
(5) Demographic controls: sex, age, education level, marital status, and MOS.

Each variable set, and the research hypotheses associated with it, is described in the remainder of this section.

Aptitude Measures

Cognitive Aptitude

General cognitive aptitude, often represented by general verbal and quantitative aptitude tests (e.g., like those in the ASVAB), appears to have a weak, negative relationship with accident involvement. A meta-analysis (i.e., quantitative combination of findings from many individual studies on a topic) by Arthur, Barrett, and Alexander (1991) indicated a corrected mean bivariate correlation of .12 for general cognitive aptitude with vehicular accident involvement, and the 95% confidence interval did not contain zero. (Arthur et al. expressed the correlation as a positive correlation, although in their text they indicate that it means that higher cognitive ability is associated with lower levels of accident involvement. In the remainder of this literature review, references to their meta-analysis will have the direction reversed from what they reported in their table so that it matches their text and the relationship of variables to the increased likelihood of being in an accident.)

Among the few studies evaluating the relationship of general cognitive aptitude and accident criteria in the military, Matyuf (1995) did not find most ASVAB tests to be related to accidents. However, Runcie and Seaver (1991) did report that earlier research in the Army and Navy found that aptitude subscales were significantly related to accident involvement. Based on the meta-analytic evidence, we expected general cognitive aptitude measures to have small, though significant, bivariate correlations with accident involvement (e.g., -.12). Thus, we proposed the following hypothesis:

Hypothesis 1: Cognitive aptitude will be negatively related to accident involvement and seriousness.

Spatial Aptitude

Spatial aptitude involves the capacity to understand the relationships among objects in space. The Project A research used two paper-and-pencil measures (Assembling Objects and Object Rotation) to assess soldiers' spatial visualization, a maze test to measure spatial scanning, a map test to measure spatial orientation, and a figural reasoning test to measure inductive reasoning with visual objects. Perceptual aptitude involves the capacity to detect and interpret stimuli and avoid distractions from irrelevant stimuli. Psychomotor aptitude involves the capacity to physically react with speed and accuracy to perceived stimuli. Project A research used computerized perceptual and psychomotor aptitude measures to assess soldiers' scanning speed, distractibility, short-term working memory, eye-hand coordination, choice reaction time, control precision, multilimb coordination, and judgment of the speed and direction of moving objects.

Among studies that have assessed relationships between spatial aptitude and accident involvement, Arthur, Barrett, and Doverspike (1990) did not find figural reasoning test scores to be significantly correlated with vehicular accidents in a field study. In their meta-analysis, Arthur et al. (1991) reported that measures of perceptual style had a mean corrected bivariate correlation of -.15 with vehicular accident involvement, and a 95% confidence interval ranging from .09 to

.23. Two of the primary measures used to assess perceptual style have been the Embedded Figures Test and the Portable Rod-and-Frame Test. Both tests measure a construct labeled "field independence/dependence." This construct refers to the aptitude to detect simple forms hidden in complex patterns. Elander et al. (1992) suggested that field dependence may be a very useful variable for predicting accident involvement.

Perceptual and Psychomotor Aptitudes

With respect to perceptual aptitude, Arthur et al. (1991) estimated that measures of selective attention had a corrected mean bivariate correlation of -.26 with accident rates and a 95% confidence interval from -.21 to -.32. Auditory measures of selective attention that have been used include the Dichotic Listening Test (DLT) and Auditory Selective Attention Test (ASAT). These tests use stereo headphones to present different auditory stimuli to each of a listener's ears simultaneously. The Visual Selective Attention Test (VSAT) uses a microcomputer screen to present stimuli to subjects. A cue word is presented to indicate what the subject is supposed to attend to at different places on the screen at different times. Arthur et al. (1990) found the ASAT to be significantly related to error-accidents and to vehicular accidents in regression analyses, and Arthur and Doverspike (1992) found the ASAT significantly correlated with accident involvement.

Arthur et al. (1991) also estimated that choice and complex reaction times had a corrected mean bivariate correlation of .05 with accident criteria, and a 95% confidence interval from .03 to .08. An example of choice reaction time is the amount of time it takes subjects to respond to different stimuli presented on a screen. An example of complex reaction time is the time and appropriateness of subjects' responses to different symbols embedded in a field (e.g., different traffic signs embedded in photographs of driving scenes). Simple reaction time involves a test such as asking a subject to depress a brake pedal whenever a red disk appears on a screen. Mihal and Barrett (1976) found that simple and choice reaction times were not related to accident rates in their study.

The present research was limited in two ways in the ability to measure perceptual and psychomotor aptitudes. In Study 1, we were limited to the set of measures which were collected as a part of the Project A study. In Study 2, we were limited by the time available to develop and administer new tests to troops and to the test scores recorded in the EMF database. Fortunately, Project A included several paper-and-pencil spatial aptitude and computerized perceptual and psychomotor aptitude tests. Although these tests are not the same as those used in previous research on accident involvement with the general population, they assess many of the same aptitudes. In Study 2, time limitations prevented the inclusion of auditory or visual selective attention tests and field dependence tests. Selective attention and reaction time tests require special stereo or computer equipment and should be administered to individual soldiers one at a time. Field dependence tests also require special visual equipment and extensive time to administer (e.g., two or more hours for the Embedded Figures Test). Fortunately, we identified an alternative test that assesses related perceptual aptitudes. Paper-and-pencil spatial aptitude tests were included in Study 2. We expected spatial, perceptual, and psychomotor aptitude tests to have bivariate correlations with accident involvement that are in the range of -.15 to -.30—low to moderate relationships. We expected soldiers who had higher accuracy scores on perceptual

and psychomotor tests to have fewer or less severe accidents, while we expected soldiers who had higher response time scores (i.e., took longer to answer) on these tests to have a greater number of accidents and more severe accidents. Specifically, we tested the following hypotheses:

> *Hypothesis 2: Spatial aptitude test scores will be negatively related to accident involvement and seriousness.*

> *Hypothesis 3a: Perceptual and psychomotor aptitude test scores on accuracy will be negatively related to accident involvement and seriousness.*

> *Hypothesis 3b: Perceptual and psychomotor aptitude test scores on response times will be positively related to accident involvement and seriousness.*

Temperament Measures

Type A

Several temperament measures have been considered as predictors of accident involvement. For example, measures of a construct labeled "Type A," which were developed to assess individual trait characteristics related to the incidence of coronary heart disease (CHD) (Houston & Snyder, 1988), have been used in some past research on accident involvement. However, most of the research on Type A has concerned its relationship with stress disorders and heart attacks. The concept of the Type A behavior pattern (TABP) was developed in the mid-1950s after health experts observed a pattern between certain emotions and behaviors and CHD.

Elander et al. (1992) indicated that relationships between Type A and accidents had been mixed in previous research, but that the aggressiveness/competitiveness subscales of Type A correlated positively with accidents. Matyuf and White (1992) found hostility to be positively related to accidents, Magnavita et al. (1997) found aggressiveness/competitiveness correlated positively with traffic accidents, and Perry (1986) found time urgency and impatience were both related to accidents and driving violation tickets. In Perry's study, Type A was correlated .29 with number of accidents and .35 with number of violations. Impatience was correlated -.04 with accidents and .23 with violations. Arthur et al. (1991) reported that general activity level (including aggression, depression, and other unknown measures) had a corrected mean bivariate correlation of .07 with accidents and a 95% confidence interval of .05 to .10.

Type A measures have often not been developed with careful delineation of the content domain of the Type A construct. Measures and definitions include such personality traits as inappropriate aggression and hostility, speed and impatience, job involvement and responsibility, competitiveness, persistent desire for achievement and recognition, improper planning for goals, and polyphasic behavior (i.e., engaging in multiple behaviors simultaneously) (Edwards, Baglioni, & Cooper, 1990; Hellriegel, Slocum, & Woodman, 1995; Houston & Snyder, 1988; Powell, 1987). In recent years, researchers have tentatively concluded that it is likely to be the aggression and hostility portion of TABP that is most highly related to CHD, rather than the entire TABP complex (Houston & Snyder, 1988). Work has been done to better define subscales or

factors within the TABP and improve its measurement (Edwards et al., 1990; Spence, Helmreich, & Pred, 1987).

Given this direction in the TABP research, the present research project focuses on subscales of TABP. In particular, we expected that impatience, competitiveness, polyphasic behavior, and aggression could all possibly be related to accident involvement. Impatience could cause drivers to speed excessively, competitiveness and aggression could cause drivers to be too emotionally involved in driving and engage in aggressive behaviors toward other drivers, and polyphasic behavior could reduce drivers' attention to the road. Improper planning for goals is very closely related to the construct of impulsivity, which has been defined as "the extent to which an individual behaves with little forethought for the consequences of their behavior" (Frone, 1998, p. 13). We could also expect that more impulsive drivers fail to signal other drivers and make rapid changes that could cause them to be involved in more accidents. We will discuss impulsivity further and propose a separate hypothesis to test its relationship with accidents later in this section. We expected correlations between Type A subscales and accident involvement to be in a moderate range, from .20 to .35. We did not expect job involvement, job responsibility, or achievement orientation to be significantly related to accident involvement. Based on the literature, the following hypothesis was tested:

Hypothesis 4: Type A subscales representing impatience, competitiveness, polyphasic behavior, and aggression will be positively related to accident involvement and seriousness.

Agreeableness

Research on personality characteristics has identified five major factors of personality that are considered by many personality research experts to subsume the many subfactors and subcales of personality measured over the years in personality research (Barrick & Mount, 1991). One of these "Big 5" personality factors is agreeableness, which refers to personality traits related to how well an individual gets along with others and how friendly the individual is. Agreeableness is inversely related to the constructs of hostility and aggression that are measured by subscales of Type A, discussed above. Certainly, the Army's Assessment of Individual Motivation (AIM) measure seems to tap behaviors related to hostility and aggression in its agreeableness scale. Agreeableness has been found to be negatively and significantly correlated with the number of tickets received for moving violations (Arthur & Graziano, 1996). Donovan and Marlatt (1982) suggested that assaultiveness, hostility, and irritability would be related to accident involvement. Based on this past research and the content of the agreeableness scale, we expected the relationship between agreeableness and accident involvement to be in a low to moderate range, from -.15 to -.25. In addition to the previous hypothesis on the relationship between Type A and accident involvement, we also proposed the following hypothesis:

Hypothesis 5: Agreeableness will be negatively related to accident involvement and seriousness.

Social Deviance

Other temperament characteristics that have received some research attention in the accident risk prediction literature are social deviance, delinquency, and related constructs. Arthur et al. (1991) reported a corrected mean bivariate correlation of -.16 for regard for authority with accident criteria and a 95% confidence interval from -.12 to -.19. Elander et al. (1992) indicated that delinquency and criminality are useful in predicting driving accidents. Hansen (1989) found that the General Social Maladjustment scale was related to accidents. A measure of mild social deviance was found to be strongly correlated to accidents and speeding (Lawton, Parker, Stradling, & Manstead, 1997; West, Elander, & French, 1993). The Dependability measures on the assessment of background and life experiences (ABLE) similar in content to AIM, described in more detail in a later section and AIM most closely represent the construct of "nondelinquency," rather than the dependability or conscientiousness construct as used in the "Big 5" personality constructs. Although Matyuf (1995), who used the same measure and some of the same data as used in this study, did not find dependability (i.e., nondelinquency) to be related to accident involvement (r=-.02), Matyuf and White (1991) reported that dependability was significantly negatively correlated with bad driving behavior and accident involvement. Using the effect sizes from past research as a guide, we expected the bivariate correlation between mild social deviance and accidents to be in the range of .15 to .25 (negative correlations between nondelinquency and accident criteria). Based on these types of previous findings, the following hypothesis was tested:

Hypothesis 6: Social deviance will be positively related to accident involvement and seriousness.

Locus of Control

Locus of control is a construct related to whether or not individuals tend to believe that they have control over what happens to them. Individuals who have an internal locus of control believe that they can influence what happens to them, whereas individuals who have an external locus of control are more fatalistic and believe that factors external to themselves (e.g., events and other people in their environment) have greater influence over what happens to them than they do. In the Arthur et al. (1991) meta-analysis, locus of control had a corrected mean bivariate correlation of .20 with accident involvement, with a 95% confidence interval from .15 to .24. Elander et al. (1992) reported that locus of control has mixed evidence of a relationship to accident involvement. Some individual studies have found that internal locus was negatively correlated with bad driving behavior (e.g., Matyuf & White, 1992). Arthur and Doverspike (1992) suggested that the relationship between accident involvement and locus of control is stronger when a measure of locus of control targeted to a specific behavior is used. Montag and Comrey (1987) developed such a targeted measure specifically for driving-related internal and external locus of control and got bivariate correlations of -.32 for internal locus and .26 for external locus with an accident criterion. However, Arthur and Doverspike (1992) used the same measure and got a positive .15 bivariate correlation between internal locus of control and not-at-fault accidents—in the opposite direction of their hypothesis. Based on this past evidence, mixed as it is, we tentatively expected the bivariate correlation between internal locus of control to be in

the range of -.20 to -.25, and the bivariate correlation between external locus of control to be in the range of .20 to .25. The following hypotheses were tested:

Hypothesis 7a: Driving-specific internal locus of control will be negatively related to accident involvement and seriousness.

Hypothesis 7b: Driving-specific external locus of control will be positively related to accident involvement and seriousness.

Thrill Seeking and Impulsivity

Risk taking, sensation seeking, and thrill seeking instruments measure such things as individuals' desires for thrill and adventure, disinhibition, impulsivity, and experience seeking (Donovan & Marlatt, 1982). Researchers for the American Automobile Association Foundation for Traffic Safety (Lonero et al., 1995, p. 4) indicate that most of young drivers' increased risk "comes from inappropriate behavior—deliberately taking risky actions, seeking stimulation, driving at high speeds, and driving while impaired." Elander et al. (1992) indicated that risk taking has been related to crash involvement, and that impulsivity subscales are likely to be better predictors of crash involvement than extraversion and neuroticism scales. Trimpop and Kirkcaldy (1997) found that thrill and adventure seeking and disinhibition were significantly related to whether young males had convictions for moving violations. Although there is not substantial evidence on the relationship between thrill seeking and accident involvement, the relationship makes sense conceptually. We would expect to find moderate bivariate correlations for thrill seeking and impulsivity with accident involvement, in the range of .20 to .30. Therefore, the following hypotheses were tested:

Hypothesis 8: Thrill seeking will be positively related to accident involvement and seriousness.

Hypothesis 9: Impulsivity will be positively related to accident involvement and seriousness.

Conscientiousness

Conscientiousness (also often labeled dependability), one of the Big 5 personality characteristics (Barrick & Mount, 1991), has been found to have a negative (though often relatively small) bivariate correlation with accident involvement in several studies. Arthur and Graziano (1996) found that conscientiousness had a significant negative bivariate correlation with total accidents (-.15) and at-fault accidents (-.18). These bivariate correlations controlled for (i.e., partialled) age, sex, scores on three aptitude tests, self-monitoring, and other personality factors. Elander et al. (1992); French, West, Elander, and Wilding (1993); and West, Elander et al. (1993) have all reported that the decision-making style of thoroughness, which is conceptually somewhat similar to the idea of conscientiousness, has been negatively and significantly related to accident involvement. Matyuf and White (1991) found that a higher work orientation was negatively correlated with bad driving behavior. We expect conscientiousness and measures based on related

constructs, like work orientation, to be negatively related to accident involvement with a bivariate correlation in the range of -.15 to
-.20. (It is important to caution that the ABLE/AIM Dependability construct measured in this study is not equivalent to conscientiousness or to any of the other Big 5 measures; rather, a more appropriate label for this construct is "nondelinquency," and the relationships between the dependability measures and the accident criteria are evaluated under Hypothesis 6 on social deviance.)

Hypothesis 10: Conscientiousness will be negatively related to accident involvement and seriousness.

Extraversion, Adjustment, and Intellectance

Extraversion, adjustment, and intellectance are the other three Big 5 personality factors (Barrick & Mount, 1991). Extraversion had positive relationships with accident involvement (Arthur & Graziano, 1996). However, reviews of the literature have indicated that relationships between extraversion and accident involvement are mixed (Arthur & Graziano, 1996; Elander et al., 1992). Based on this mixed evidence we expected that, after controlling for other variables in multivariate analyses, extraversion would not likely have a significant relationship with accident involvement.

Relationships between adjustment (also referred to by some researchers as neuroticism) and accident involvement have been mixed in previous research, as well (Elander et al., 1992). It makes conceptual sense that those individuals who are less emotionally well adjusted may be more likely to engage in dangerous behaviors. Impulsivity, hostility, immaturity, and social deviance may all be related to the overall concept of adjustment. However, it has been suggested that more specific constructs, such as social deviance and impulsivity, are likely to have stronger relationships with accident involvement (Elander et al., 1992). Thus, this does not suggest strong enough support for the development of a directional hypothesis for adjustment.

There has been little research on intellectance and its relationship to accident involvement; it may have a negative relationship with accident involvement (Elander et al., 1992), but there is not enough previous research or conceptual support for such a relationship to suggest developing a formal hypothesis. In summary, because of weak research and conceptual support, we did not test any formal hypotheses based on extraversion, adjustment, or intellectance, although we included them, or concepts similar to them, in some of our analyses.

Driving Style/Attitudes

Several measures of driving style, behaviors, and attitudes have been developed and used in past studies to determine how they are related to accident involvement. Most of this research has found support for significant relationships between some aspects of driving behavior or attitudes and accident involvement; however, past research has not often included adequate control for other potential predictors of accident involvement.

Landy and colleagues (American Public Transit Association, 1994) reported that a measure of the frequency of unsafe behavior of bus drivers was correlated with their supervisors' ratings of their driving safety (-.25) and number of accidents (.11). Cooper (1997) found that speeding violations and driving errors were related to accidents. For the most severe accidents, highly excessive speed and driving under the influence were involved; for accidents of moderate severity, lower-level speeding above the limit was involved; for accidents of low severity, right-of-way, traffic control, and other infractions were most frequently involved. French et al. (1993) found that speed was correlated .22 with accident involvement. Perry (1986) reported that law breaking was correlated .27 with accidents and .23 with driving violations. West, French, Kemp, and Elander (1993) found that accident involvement was correlated .32 with self-reported preferred speed. West and Hall (1997) found that speed, attitude, and social deviance were all correlated with active involvement in causing an accident, and speed was correlated with passive involvement in an accident (non-culpability). The internet web-site for the National Highway Traffic Safety Administration (U.S. Department of Transportation National Highway Traffic Safety Administration [NHTSA], 1998) reports that seat belt use, speeding, and alcohol use are all highly related to accidents and fatalities.

Elander et al. (1992) summarized the literature on this subject by noting that the faster simple reaction time of youth and the superior driving skill of professional drivers seems to be overwhelmed by the faster speed and riskier styles of their driving. Young drivers tend to drive fast and not leave adequate braking room for their speed. People tend to rate themselves above average in driving skill and be overconfident about their driving ability, and violators tend to be less constrained by others' opinions and the possible negative consequences of their behavior. Elander et al. also noted that choice or preferred speed tends to be consistent over time for individuals, and that questionnaire measures of driving style have been shown to be useful surrogates for the direct observation of drivers. Given the effect sizes found in past research, we would expect measures of risky driving behaviors and negative attitudes about driving safety to have bivariate correlations in the range of .10 to .35 with accident involvement. Specifically, we tested the following hypotheses:

Hypothesis 11: Measures of risky driving behaviors will be positively related to accident involvement and seriousness.

Hypothesis 12: The number of tickets for moving violations individuals have received will be positively related to accident involvement and seriousness.

Hypothesis 13: Negative attitudes about driving safety, laws, and regulations will be positively related to accident involvement and seriousness.

Transient Variables

Transient variables are those which can change over time and may have a differential influence on one's risk of accident involvement during one's lifetime. Transient variables can include at least two categories of variables: situational and personal. Situational transient variables are characteristics of the situation or environment in which one is driving (e.g., weather conditions). Personal transient variables are those

characteristics or behaviors of the individual at the time of the accident. Personal transient variables change over time (e.g., age is a transient personal variable—one's birth year itself is not considered to be a relevant factor in accident prediction, but the time since one's birth year, or current age *is* considered to be a relevant factor in accident prediction).

Situational

Vehicle & Safety Equipment

The type of vehicle and availability and use of safety equipment can also be expected to influence the risk of accident involvement. Among the general population in the U.S., some types of vehicles are considered safer than others due to their size or construction (Insurance Institute for Highway Safety, 1998; NHTSA, 1998). There is a considerable range of vehicle types in use in the Army; some of these types of vehicles are not used as commonly by or are not available to the general U.S. population. Thus, it was important to include the type of vehicle used in analyses to determine whether significant differences may exist among different types of vehicles. The majority of accidents causing fatalities among soldiers are, however, in POVs. In addition, motorcycle use can be a factor influencing the risk of accident involvement (NHTSA, 1998). So, whether one is driving while on or off duty and the type of vehicle driven were included in analyses. Failure of motor vehicle equipment (e.g., tires blown out, brake failure) and experience driving the vehicle were also included to determine how often accidents involve such problems.

Information on the use of safety equipment, such as use of seat belts and motorcycle helmets, was also collected. Certainly, among the general population of U.S. drivers, seat belt use is considered to be an important factor affecting the likelihood of severe injury or fatality in a motor vehicle accident (NHTSA, 1998), although it is not considered to be a factor in preventing an accident.

Driving Conditions

Driving conditions can also influence the likelihood of an accident. Information about inclement weather, such as heavy rain, thick fog, and snow or ice accumulation at the time of soldiers' accidents, was included in analyses. The type of roadway can influence accident occurrence (U.S. Department of Transportation Bureau of Transportation Statistics, 1998; Elander et al., 1992). The hour during which one is driving can also affect the likelihood of accident involvement because of differences in visibility. The hour and day of the week can affect the likelihood of accident involvement due to the greater risk of meeting a driver who has consumed alcohol and/or drugs late on a weekend night. Familiarity with the road, presence of passengers, and the location of the accident should be considered (Insurance Institute for Highway Safety, 1998; NHTSA, 1998). We expected to find the following:

Hypothesis 14: Inclement weather will be positively related to accident involvement and seriousness.

Hypothesis 15: Late night driving on weekends will be positively related to accident involvement and seriousness.

Personal

Personal variables include some control variables mentioned above, such as age, marital status, and MOS. Other transient variables related to the person driving a vehicle include years of driving experience, type of driver training, average mileage driven, education level, military rank, socioeconomic status, leisure activities, and alcohol or drug use (Elander et al., 1992; NHTSA, 1998). Sleep deprivation is considered to be related to many automobile accidents in the U.S. because many people fail to get enough sleep (Elander et al., 1992). Stress caused by major life events, such as a divorce (McMurray, 1970), or work- and family-related stress appears to increase the risk of accident involvement (Elander et al., 1992). The ability to evaluate relationships between some of these variables and accident involvement depended heavily on our ability to obtain accurate information from USASC accident records and soldiers' self-reports of accidents. We were aware that incomplete data in USASC records and inaccurate memories of accident situations would hamper the ability to find significant relationships between personal transient variables and accident involvement. Assuming reasonably accurate and complete data, however, we sought to test the following hypotheses:

Hypothesis 16: High levels of stress and major life changes will be positively related to accident involvement and seriousness.

Hypothesis 17: Sleep deprivation will be positively related to accident involvement and seriousness.

Hypothesis 18: Use of alcohol and/or drugs will be positively related to accident involvement and seriousness.

Control Variables

National fatality and accident statistics show that age and sex are correlated with accident involvement. The youngest drivers (i.e., 16-24 year olds) are involved in proportionally more accidents than older drivers, and males are involved in proportionally more accidents than females (NHTSA, 1998). There are several possible explanations for why this is the case. For example, it is postulated that younger drivers drive less cautiously and have less driving experience than older drivers. As for the difference between males and females, it has been suggested that males have more exposure to risk because they drive more than females, and that there may be significant differences between males and females in driving behavior. It may be that male drivers, particularly young males, engage in more risky driving behaviors. Given such potential explanations, it could be expected that the relationship of age and sex with accident involvement might be completely mediated by variables that have a more immediate relationship with accident involvement (e.g., driving attitudes and behaviors, annual mileage driven). It is important to control for variables such as age and sex by including them in multivariate analyses to determine whether they add any incremental validity to a set of predictors, or whether such variables are mediated by the predictor variables.

Control variables used in the present research included age, sex, MOS, and marital status. Several of these variables may change over time, and thus could be considered transient variables. For example, one's marital status might change and influence one's driving behavior due to the stress of going through divorce or the death of a spouse. One's MOS might change and influence one's mileage, types of vehicles, or road conditions in which one drives, thereby changing exposure to driving-related accident risk. Additional attention will be given to the relevance of transient variables in the next section.

Table 1, which appears later in this report, summarizes the subject and direction of the hypotheses.

OVERVIEW OF ANALYTIC METHODS

A preliminary analysis was conducted using statistics from the USASC and the accident research literature to determine how the U.S. Army's current motor vehicle accident record compares to that of the U.S. population. The goal was to develop a statistic that might be used as a baseline figure for measuring how the Army's accident record changes over time relative to that of the general population. National statistics were used to determine the U.S. resident population's fatality rate. Information from national statistics on fatality rates within gender and age groups was then used to adjust the national statistic for the U.S. resident population. Adjustments weighted the fatality rate figure by sex and age groups so that it was representative for a U.S. resident population with the same proportions in the sex and age group as in the U.S. Army. More detail on this analysis and its findings are reported in the next section.

After merging data to create the Study 1 and Study 2 databases, simple analyses (e.g., frequencies) were used to check the quality of the data and logical consistency among various types of information in the databases. Variables were recoded (e.g., to convert string variables into numerical variables, to combine many small categories into fewer categories). Descriptive statistics were computed, including means and standard deviations. Distributions of variables, particularly of the accident criterion, were assessed to determine what type of analytic methods would be appropriate. Standard deviations, ranges, and sample sizes on each variable were used to determine whether there was adequate variation and sample size on a variable for it to be useful in analyses. Reduction in sample size on some variables was a concern because including a variable with a small sample in multivariate analyses could reduce statistical power of the analysis and dramatically change the nature of the sample and findings. When possible, variables with greatly reduced samples were used only in bivariate analyses, in isolated multivariate analyses with few other variables, or with pairwise deletion of missing data. Bivariate correlations among independent (predictor, transient, and control) variables were calculated to assess relationships among the variables and to determine whether we should expect any problems in multivariate analyses from multicollinearity.

Validity analysis involved two main types of statistical analyses: (1) bivariate correlations of independent variables with the accident criterion, and (2) multivariate analyses assessing the relationships of the independent variables with the accident criterion. Bivariate correlation analyses assessed the size of relationship between a single independent variable and the accident criterion. Correlations used are Pearson product-moment (point-biserials and phi coefficients are

mathematically equivalent to Pearson product-moment coefficients, so point-biserials and phis do not need to be calculated; Andrews, Klem, Davidson, O'Malley, & Rodgers, 1981). The most appropriate multivariate analyses were ordinary least-squares multiple regression, logistic regression for dichotomous dependent variables, and event history analyses. The concern in this analysis was to use data from each subject as optimally as possible. Event history analysis was an ideal method for achieving this goal when dealing with longitudinal data and cases that could be in the database for only part of the period of time the database covered. Event history analysis was used in Study 2 to deal with the possibility of nonindependent repeated criterion events (i.e., the same soldier could have more than one accident; to treat the multiple accidents as independent events would lead to coefficients representing relationships between independent variables and the accident criteria that were inflated and higher than their true value).

DEVELOPING A BASELINE STATISTIC FOR EVALUATING THE U.S. ARMY'S MOTOR VEHICLE ACCIDENT RECORD

The most recent year for which both the U.S. national and USASC fatality statistics were available at the time of this analysis was 1996. In addition, there had been some discussion of the fact that accident statistics for the Army ground accident fatality rates had been unusually high in 1997 and that this was likely due merely to chance. So, the analyses to develop the baseline statistic were based only on data from 1996. USASC data, taken from their internet site (October 8, 1997), were used to determine the fatality rate for soldiers. There were 145 ground fatalities not including those from Personnel Injuries (i.e., those not in motor vehicles). Imputing the number of soldiers they used to compute the accident rate statistics from the statistics available on their internet site, we determined that there were approximately 25.0 fatalities in ground, non-personnel injury accidents per 100,000 soldiers in FY96.

Data shown on the NHTSA's internet site on March 24, 1998 were used to develop a relevant comparison statistic for the U.S. population. Not all soldiers are licensed, so fatalities for the U.S. resident population, rather than fatalities for the *licensed* U.S. resident population, were used. Because the Army has higher proportions of youth and males than the U.S. resident population, we developed a comparison statistic based on the weighted mean of the fatalities per 100,000 in the gender and age categories that matched those for Army military personnel. Age categories used by the IIHS were very similar to the age categories used by the Army (Tables B-13 and C-15 for enlisted soldiers in the active Army and Army reserve, *Population Representation in the Military Services*, Office of the Assistant Secretary of Defense, 1996).

The weighted mean number of motor vehicle deaths per 100,000 U.S. residents that one would have expected for 1996 if the resident population had the same proportions of gender and age groups as the U.S. Army, would have been 29.3 fatalities/100,000 residents. So, the 25.0/100,000 for actual Army fatalities is lower than what one would have predicted using a hypothetical U.S. resident population with the same proportions of gender and age groups as exist for Army military personnel.

Other important variables that could not be used in the above analyses were annual mileage driven and states of location of the U.S. Army population. Annual mileage driven is considered to be related to accident probability, because it represents one type of exposure to motor vehicle

accident risk. National statistics also indicate that state motor vehicle fatality rates vary considerably and in a consistent pattern (IIHS, 1998). Unfortunately, we did not have the detailed data one would need on the U.S. Army to control for annual mileage and states of location in developing the baseline figure for comparing Army motor vehicle fatalities to U.S. resident population motor vehicle fatalities. We did control for these variables in Study 2, because we were able to collect self-report data for those factors.

STUDY 1—CURRENT DATABASE STUDY

Method

Sample

The sample for Study 1 comprised the enlisted soldiers who accessed into Army active duty from August 1986 through November 1987, and who constituted the original sample for the longitudinal validity study of the Project A research. These soldiers received a four-hour Experimental Predictor Battery within two days of arriving at their assigned Reception Battalion. Data were collected at eight Reception Battalions over a 14-month period by permanent, on-site data collection teams.

The Project A sample is very suitable for this research for several reasons. First, it provides a large sample size (i.e., more than 60,500) that should provide very high levels of statistical power to detect significant relationships and improve the accuracy of point estimates of bivariate correlations and regression coefficients. Second, it is a sample of enlisted soldiers, and enlisted soldiers experience approximately 89% of all POV Class A-C accidents (Class A-C refer to the top three most serious classes of accidents; USASC, 1998). Third, the Project A research developed a database of information on these soldiers that includes their social security number (SSN), allowing us to link the database information to accident records from the USASC. Fourth, the Project A database also contains several cognitive, spatial, perceptual, and psychomotor aptitude test scores and temperament measure scores, as well as demographic and Army career information. Thus, this sample allowed use of a longitudinal, predictive design that allowed analysis of the relationships between predictor measures collected in 1986-87 and accident involvement information collected for several years after the soldiers accessed into the Army.

We merged soldiers' records from the Project A database with matching data from the EMF. Researchers working on Project A had collected EMF data for soldiers in the Project A database on a quarterly basis. They could be matched by SSN to the Project A data. The EMF data had been collected on the soldiers from the time of accession through the fourth quarter of 1993. The EMF data (a.k.a., "EMF link file") included demographic, education, pay grade, date of birth, and other background information on soldiers. We took the combined EMF and Project A data sets and then merged them with accident records from the USASC for the soldiers in the Project A sample to complete the database for Study 1. We gave soldiers who had no match in the USASC database a code representing no accident involvement and empty data fields for variables describing accidents. Soldiers who did have one or more accident matches in the USASC data had their Project A data matched to their USASC accident data.

Criterion Variables

Accident records for soldiers in the Project A database were obtained from the USASC by providing the USASC with a list of SSNs of the soldiers in the database. The USASC then provided us with all accident records in their files for the soldiers who were identified by any of those SSNs. A soldier in the database could have had an accident record in the USASC files at any time from their date of accession (sometime in FY86 or 87) through their date of final separation from the Army, or through the end of the third quarter of FY98 if they were still in the Army.

Information in the USASC accident records was used to identify only those accidents that occurred while a soldier was driving a motorized or tracked vehicle. Based on this restriction, we identified a total of 734 accidents for the 60,560 soldiers in the Project A database. One soldier had three accident records, 11 soldiers had two accident records each, and 709 soldiers had a single accident record in the USASC files. Thus, 721 soldiers had one or more accidents in the database, which was less than 1.2% of all soldiers in the total Project A sample.

Although the original project tasking focused only on research involving the selection of military vehicle operators, we did not eliminate off duty accidents from those studied. To do so would have further reduced the already very small proportion of soldiers in our sample who had at least one USASC accident record. Analyses based on just those who had accidents while operating military vehicles would have resulted in less reliable and precise estimates (i.e., less likely to be replicated in another sample or in the total "population" of all accidents in which soldiers were drivers) of relationships between predictor and criterion variables. In addition, the majority of accidents and fatalities involving military drivers take place in POVs, so ignoring them might cause us to miss findings that can be used to reduce accidents and fatalities among soldiers. Some selected analyses are conducted on on duty accidents only to determine whether the factors causing on duty accidents are different from those causing off duty accidents.

We used whether or not a soldier had an accident in the database for the criterion variable, "Had an Accident," shown in Table A1 in Appendix A. Because so few soldiers had more than one accident record, we did not analyze the number of accident records. Such analyses would lack sufficient statistical power to distinguish differences between those who had more than one accident and those who had only one accident record. Therefore, Had an Accident was the only criterion variable used to represent soldiers' involvement in accidents, and it was a dichotomous variable with a highly skewed distribution. Although the small proportion of soldiers who had an accident record (1.2%) relative to the much larger proportion who did not have one (98.8%) is a distribution that could severely reduce the statistical power to detect true relationships that exist between variables, an analysis of the statistical power indicated that with the large sample size (up to 60,560 for some analyses) statistical power was near 100%.

To analyze the seriousness of accidents, four criterion variables were analyzed: total cost of an accident, number of injuries in the accident, number of fatalities in the accident, and the severity classification given to the accident by the Army based on costs, work days lost, injuries, and fatalities. The Army uses a system to classify accidents and code their severity that is called the Army Mishap Classification (AMC). A Class A accident, the most serious, had a total cost of $1,000,000 or more or an injury and/or occupational illness that resulted in a fatality or permanent

total disability. A Class B accident had total cost of reportable property damage of $200,000 or more, but less than $1,000,000, an injury and/or occupational illness that resulted in permanent partial disability, or five or more personnel who were inpatient hospitalized. A Class C accident had total cost of property damage of $10,000 or more, but less than $200,000, a nonfatal injury that caused any loss of time from work beyond the day or shift on which it occurred, or a nonfatal illness or disability that caused loss of time from work or disability at any time. A Class D accident had total cost of property damage of $2,000 or more, but less than $10,000. Class E incidents, in which a mission is interrupted or not completed due to human/materiel/environmental factors and cost of property damage of less than $2,000, were not included in data received from the USASC. Class A was coded 4, Class B 3, Class C 2, and Class D 1, so that a higher number would represent a more severe accident.

Table A1 shows that the average cost of the 734 accidents analyzed for this study was over $22,000. Cost figures were determined from the value in the USASC accident record. The USASC does not adjust costs for inflation or for changes in the value of the dollar over time. Table A1 also shows that the accidents analyzed included nearly one (.88) injury and less than .13 fatalities per accident. Data on these criteria were complete for the sample of accidents studied, and the data in the records appeared reliable enough for use in analyses. Unlike Had an Accident, these criteria are continuous or categorical variables with distributions well suited for analyses with standard statistical methods (i.e., ordinary least squares (OLS) regression).

An attempt to differentiate at-fault and not-at-fault accidents was unsuccessful given that the USASC database often had missing or ambiguous data on the items describing errors or mistakes made by the driver. The change in the USASC's code used to describe driver error during the years of accident records included in this study made the judgment of fault too ambiguous and imprecise. Because there would likely be considerable error in coding of accident fault, we decided this criterion would be too unreliable for analysis in Study 1.

We also reviewed criterion measures in the Project A database to determine if there was any information that might be useful as criteria for the present research. Unfortunately, none of the measures collected on the full sample of Project A soldiers is closely related to the desired accident behavior criterion. Supervisors and peers rated soldiers in the truck driver MOS (88M) on "Driving Vehicles" and "Safety Mindedness." These ratings might be of some interest in the present research. However, they were not included because the number of soldiers who were rated on these dimensions is relatively small and would not provide adequate statistical power for analysis given the many predictor variables to be included. In addition, they are all from the same MOS, which would severely limit the generalizability of any findings based on them.

Predictor Variables

Aptitude Measures

The 1980 version of the standardized ASVAB Subtest, ASVAB Area Composite, ASVAB Factor, and Armed Forces Qualification Test (AFQT) scores were used as measures of cognitive aptitudes. The subtest scores had been standardized by the Army to a mean of 50 and a standard deviation of 10 points and included scores from 11 tests on science, arithmetic, verbal aptitudes,

coding speed, auto/shop information, mechanical comprehension, and electronics. The 10 Area Composite scores combined ASVAB Subtest scores in combinations the Army has determined are useful for making placement decisions (e.g., the Combat, Clerical, and Field Artillery composites). The Army had standardized the Area Composite scores using a mean of 100 and a standard deviation of 20 points. ASVAB Factor scores were based on factor analysis by Army researchers of the 10 subtests onto four factors: Technical, Quantitative, Verbal, and Speed. The AFQT score is a single composite score based on ASVAB Subtest scores. It is used by the Army to determine whether a soldier has the general cognitive aptitude to be qualified for selection into the Army. Table A2 shows the test titles and descriptive statistics for ASVAB Subtest, Area Composite, Factor, and AFQT scores.

Spatial aptitude was measured with six paper-and-pencil tests included in the Project A Experimental Battery. The Assembling Objects test measured spatial visualization by having subjects visualize three-dimensional objects from flat drawings of unassembled objects, and the Object Rotations test measured spatial visualization by having subjects visualize how objects would rotate in space. The Map test measured spatial orientation by asking subjects to locate positions on a map given directions and other information, and the Orientation Test measured spatial orientation by asking subjects to imagine how objects' relationships to other objects would change based on verbal instructions. The Maze test measured spatial scanning by asking subjects to locate the correct outlet from a two-dimensional maze, and the Figural Reasoning test measured inductive reasoning using spatial figures. Descriptive statistics for these six tests are shown on Table A3. The Project A database also contains a spatial test composite score, for which descriptive statistics are shown in the last section of Table A4.

Perceptual and psychomotor aptitudes were measured with several computerized tests included in the Project A experimental battery. These tests include the Simple Reaction Time (measures reaction accuracy and time with a simple visual stimuli), Choice Reaction Time (measures reaction accuracy and time for choosing between simple visual stimuli), and Cannon Shoot (measures accuracy of judgments about the speed and direction of moving objects) tests. They also include the Short Term Memory and Number Memory (measures short-term working memory capacity), Perceptual Speed and Accuracy (measures rapid scanning, reaction to irrelevant stimuli, memory, speed, and eye-hand coordination), Target Identification (measures choice reaction time to recognition of military vehicles), Target Shoot (measures precision and speed in muscular movements used to hit targets), and Target Tracking (measures control precision and multilimb coordination in muscular reactions to targets) tests.

The database contains composites based on perceptual and psychomotor tests which represent basic accuracy, basic speed, movement time, number speed and accuracy, perceptual accuracy, perceptual speed, psychomotor, and short term memory. Descriptive statistics for individual measures are in Table A4, with statistics for composites at the end of the table. Individual speed tests are scored so that higher values represent slower responses. Scores for composites have been standardized and reversed, so that higher scores represent faster responses. More information on the development of these measures is available in Peterson et al. (1990).

Temperament Measures

Temperament was measured with scales from the Assessment of Background and Life Experience (ABLE). The ABLE was a set of temperament measures developed by researchers for the Army as part of Project A. Table A5 shows descriptive statistics for ABLE Scale scores, Composites, and Factor scores (based on both a 168- and 114-item version of the ABLE). The Cooperativeness scale score and composite represent the construct of Agreeableness. The Nondelinquency scale score and Dependability measures represent a construct that is the inverse of the Social Deviance construct discussed in Hypothesis 6 (the majority of the items on the Dependability scales originated from the Nondelinquency scale.) There are also composite and scale scores for Locus of Control and Internal Control, although they are not specifically driving-related. The ABLE Conscientiousness scale is used to test the Conscientiousness hypothesis. Hypotheses for Type A, thrill seeking, and impulsivity could not be tested with this sample because these were not included on the ABLE. Several other temperament measures, such as Dominance, Self Esteem, Emotional Stability, and Stress Tolerance, could be included in analyses, even though they are not represented by directional hypotheses. In addition, three validity scales were used to detect inaccurate self-descriptions: (1) the Non-Random Response scale assesses inattention to item content (i.e., careless or random response patterns); (2) the Self-Knowledge scale is designed to identify individuals who are self-aware and are likely to have accurate perceptions about themselves; and (3) the Poor Impression scale detects the intentional presentation of a negative self-image in order to avoid being drafted. All temperament measures included in analyses are shown in Table A5.

The Project A database also contained other measures for soldiers that are of interest to the present study, but for which there are no formal hypotheses. Tables A6 and A7 show descriptive statistics for scale and composite scores for job values measures and occupational interest scales, respectively. The Ambition value scale and High Expectations value composite represent a concept similar to that of Type A achievement orientation. The Aesthetics occupational interest scale measures interests that could be considered similar to the idea of Intellectance, and the Rugged Individualism scale measures interests for activities involving risky and/or strenuous physical activity that could be considered related to the thrill seeking temperament construct in Hypothesis 8. An empirically derived Unlikely Response scale was used to detect patterns of responses produced by careless or low-literacy respondents on the AVOICE data.

Table A8 shows descriptive statistics for knowledge tests given at the end of Advanced Individual Training (AIT/OSUT) and for ratings of soldiers' performance based on a combination of their peers' and supervisors' ratings of them made at the end of AIT/OSUT. The basic knowledge test covered basic knowledge taught in training, the technical knowledge test focused on the knowledge specific to the soldier's field (i.e., MOS), and the total knowledge score was a score based on a combination of the two tests. The first seven of the performance ratings shown were each based on a single item rating. The items all had a seven-point scale, with one being the lowest and seven the highest rating, and statements to describe anchor points on the scale. For example, the statement for "Following Regulations and Orders" for the 1 or 2 rating is, "Often fails to follow Army/unit rules, regulations, or orders; may show disrespect toward superiors." For the 3, 4, and 5 ratings, the statement reads, "Almost always follows Army/unit rules and regulations; always obeys

orders." And for the 6 and 7 ratings, the statement is, "Carefully follows the spirit and letter of Army/unit rules and regulations; obeys orders quickly and with enthusiasm."

Driving Style/Attitudes

Few measures providing any evidence of soldiers' driving style or attitudes about driving could be included in this first study because little information of this nature was contained in the archival Project A database, EMF link file, or USASC database. The EMF link file did contain enlistment waiver information for soldiers that indicated whether a soldier had needed a waiver to be allowed to enlist and for what type of offense. Offenses included the category, "Minor Traffic Related." Table A9 shows that about 0.1% of the total sample had a traffic-related enlistment waiver, while 0.3% of those who had a USASC accident record ("Accident Only Sample") had that type of offense. The percentage of the Total Sample that needed no waiver to enlist was 93%; whereas this was slightly lower (91.6% needed no waiver) in the Accident Only Sample.

In the second part of Table A9, data combined from the "What Mistake" and "Error" fields of the USASC database are shown. The many codes for types of mistakes and errors made in the two different sets of code labels for the mistake and error fields were collapsed into one variable with fewer codes. This Accident Error variable is an attempt to measure the "driving style" of the driver at the time of the accident. That is, it shows what type of error or mistake the person who completed the accident report believed the driver had made. Although it could be categorized as a transient factor, it will be included in this section as a representation of driving style.

As discussed earlier in this report, we expected there to be considerable unreliability in the Accident Error data because many code labels were ambiguous and data were missing for many cases. The means for the different Accident Error categories reflect the percentage of the sample that had a code marked for that type of error. The means for the categories sum to more than one because an individual could have more than one type of error coded. These data, rough as they are, do indicate that recklessness, bad judgment, poor driving skill, fatigue, and inattention are the largest categories of errors for those who had an accident report in this sample. The "No Accident Error" category could only be coded one if there were data for the individual in either the "What Mistake" or "Error" fields, and if the individual did not have a code for having made any of the types of errors coded.

Transient Variables

Many control and transient variables are available in the EMF link file or USASC accident database. We define transient variables as those factors that can change over time and have a differential influence on one's probability of accident involvement at different points in one's life. Many transient variables cannot be measured for this sample, including annual mileage driven, familiarity with the road, years of driving experience, pattern of alcohol or drug use, long-term sleep deprivation, and stress from major life events or work-life situations. USASC records provide data for some accidents on drivers' licensing and training, alcohol/drug involvement, hours slept the previous night, and continuous hours on duty. However, information on several of these variables was not always completed in the accident forms and it is not certain whether this information was recorded accurately by those filling out accident reports. There are many reasons an accident record

could be inaccurate. For example, persons completing accident reports might be disinclined to report that a soldier had been drinking before an accident if they did not believe the alcohol had a relationship to the accident, if they did not have firm evidence, or if they did not want the soldier to have a serious mark on record. The involvement of alcohol may be more likely to be recorded in the most serious accidents, such as those involving fatalities, where alcohol tests had to be performed.

Table A10 shows all of the Transient Situational Factors and Table A11 shows all of the Transient Personal Factors included in this study. By definition, only the values on the transient factors measured at or near the time of the accident are considered potentially relevant influences on an accident. If an individual did not have any accident, there is no record of transient variables from the time of the accident. Therefore, descriptive statistics for transient variables can only be calculated for the Accident Only Sample.

Weekend Night Hour was coded one if the accident occurred between 11 p.m. and 3 a.m. on Friday night-Saturday morning or Saturday night-Sunday morning, and coded zero otherwise. Daylight was coded one if the USASC variable "Period" was coded with the value "A" representing daytime, and Daylight was coded zero if Period had a "B" in the USASC data, which represented night. Outside Continental U.S. was coded two if the location of the accident was outside and one if the accident location was inside the continental U.S. (CONUS)

For Fatality Rate in State, each accident case was given the value equal to the deaths per 100,000 people in the state in which the accident occurred (1996 data; Insurance Institute for Highway Safety, 1998). We created this variable to try to control for the possibility that a soldier's risk of accident involvement can vary depending on where he/she is located and for the fact that soldiers are not geographically distributed in the same proportions across the continental U.S. as is the general resident population. The number of motor vehicle crash deaths differs widely among the 50 states (from 7 per 100,000 in Rhode Island or Massachusetts to 30 per 100,000 in Mississippi or Wyoming). We did not have similar data for the approximately 30% of the 734 accidents in our study that occurred outside CONUS, Alaska, or Hawaii. Thus, only 511 of the accidents in this study could be coded for Fatality Rate in State.

On Post was coded one if the accident occurred on post, and zero otherwise. The majority of accidents studied here occurred off post. On Duty was likewise coded one if the accident occurred while the driver was on duty, and zero otherwise. An On Duty accident has a greater likelihood of showing up in USASC accident records because it is more likely to be relevant to the Army (i.e., result in lost work time or damage to government property). Many off duty accidents are too minor to qualify based on the criteria established for entering an accident in the USASC database (i.e., high costs, fatalities, lost work days).

If the USASC variable TNFTX, which corresponds to a field training exercise, was coded "A" at the time of an accident, During Field Training was coded one; otherwise it was coded zero. If the USASC variable TNTACT, which corresponds to tactical training, was coded "A" at the time of the accident, During Tactical Training was coded one. Otherwise it was coded zero. During Either Type Training was coded one if either the Field or Tactical Training variables were coded one. Otherwise, During Either Type Training was coded zero.

Environmental/Weather Problem was coded one if the USASC database variables indicated that there was an environmental or weather problem present at the time and place of the accident. Otherwise, it was coded zero. Using Seatbelt/Protective Equipment could only be coded for 487 of the 734 accident cases because this variable was frequently missing from the USASC records. The variable was coded one if there was a record of the individual using a seatbelt, helmet, goggles, gloves, or other applicable safety equipment, at the time of the accident. Thus, this variable was defined more widely than just using or not using a seatbelt. The underlying logic was that perhaps individuals who tend to use safety equipment are not as high on risk taking as those who do not, so they might be in fewer accidents. Regardless of whether that may be true, use of safety equipment like seatbelts should be related to lower accident severity, according to the accident research literature.

The variable Type of Roadway collapsed the USASC codes for location of accidents into fewer categories (e.g., accidents occurring in buildings or on parking lots were combined into a single category). These categories are mutually exclusive (i.e., an accident can only be coded on one of these categorical variables). Road Speed is a variable based on the categories for the types of roadways. The speed was coded one if the accident was on a parking lot/building, country road, or off-road location. Speed was coded two if the accident occurred on a street and three if the accident was on a highway. This coding was used so that higher speed roadways would receive higher numbers than lower speed roadways. As can be seen from the mean for Street Accident in Table A10, 85% of the accidents analyzed in this study occurred on a street.

Vehicle Type collapses the USASC codes for types of vehicles into fewer categories. These categories are mutually exclusive, with the exception of Privately Owned Vehicle. The majority of the accidents occurred when the driver was operating an automobile, truck, or motorcycle. Forty-four percent of accidents in this study were in soldiers' POVs (POV coded one if in a POV, zero if not). Vehicle Size was coded one for Motorcycles, two for Automobiles, three for Jeep/Humvees, Small Trucks, or Vans, four for Other Army Vehicles and Larger Trucks, and five for Buses and Fighting Vehicles. This variable is a rough approximation of vehicle size, with higher numbers representing larger vehicles. However, this code is not as specific as weight or volume would be. Fighting Vehicles and Other Army Vehicles may not always be larger than small trucks; jeeps may not necessarily be larger than automobiles. We did not have the specific information needed to code Vehicle Size more precisely.

We could include only a few transient personal variables in this study, due to lack of data. Those that could be included are shown in Table A11. There was considerable missing information on Hours of Sleep because it was only coded if people had been on duty for several hours before the accident. There was also considerable missing information on Continuous Hours on Duty and Alcohol Use in Accident. These were all based on USASC records. Age at Time of Accident was calculated by using birth date and accident date to calculate the age in years at the time of the accident. The average age in this sample was 22.5.

Demographic/Control Variables

Table A12 shows the demographic and other control variables included in analyses. Data on these variables came from the EMF link file. Most of these variables were recorded at or very near the time of the soldier's accession. Pay Grade and MOS for the Accident Only sample are the grade and MOS at the time of the accident. Pay Grade and MOS for the Total Sample are the grade and MOS during a "median" quarter in the data. This median quarter was selected based on when the majority of the sample was still in the military and could have shown up in accident records (fourth quarter of FY88 was selected). MOS codes (two digits and one letter) were coded into appropriate categories shown in the table to reduce the number of variables analyzed in later multivariate analyses. The MOSBR, or branch variable from the USASC records, was used to help label the branches. A *Military Occupational Classification and Structure* manual (Department of the Army, 1992) was used to match numerical/letter MOS codes to branch labels. The MOS categories are mutually exclusive, with the exception of Driving MOS, which is coded one if a soldier's MOS was Transportation, Engineer, Military Police, Armored, Field Artillery, or Infantry, and zero otherwise. This Driving MOS variable was created as an attempt to have a control variable that represented greater on-the-job driving exposure than for the typical MOS. Unfortunately, attempts to locate job analysis/job description data for MOS that might indicate the amount of driving of the job were unsuccessful. Thus, Driving MOS is a rough approximation of accident exposure through on-the-job driving.

Results

Bivariate Correlational Analyses

Criteria

Table A13 shows bivariate correlations among the four criteria describing the seriousness of accidents. These intercorrelations indicate that the four variables are positively related, as one would expect. However, they are not so highly intercorrelated that one should eliminate the analysis of any of the four. Each provides unique and relevant information about accidents' seriousness.

Aptitude Measures

Table 1 shows each of the hypotheses generated and summarizes the findings associated with each. Bivariate correlations between cognitive aptitude scores and accident seriousness and involvement criteria, shown in Table A14, provide little support for the Cognitive Aptitude hypothesis. For the first four dependent variables, representing accident seriousness, the sample size is 721 accident cases. The statistical power to detect a bivariate correlation of .15 would be about 85% (using $p<.001$ due to the many significance tests in this study). However, of the 108 bivariate correlations between cognitive aptitude scores and total cost, injuries, fatalities, and severity of accidents, only one is significant ($p<.05$) which is fewer than what one might expect by chance. In addition, the significant correlation is positive, which is in the opposite direction of the

<u>Summary of Results for Hypothesis Tests for Study 1 and Study 2</u>

Hypothesis	Subject	Hypothesized Direction With Accident Criteria	Study 1 Results	Study 2 Results
14	Inclement Weather	positive	no support-results in opposite direction	mixed support
15	Late Night Weekend Hour	positive	strong support-in all types of analyses	strong support-in all types of analyses
16	High Stress & Major Life Changes	positive	not measured	support
17	Sleep Deprivation	positive	too little data	support
18	Use of Alcohol &/or Drugs	positive	strong support	support
	Other Significant Relationships for Which there were No Hypotheses			
none	On Duty	none	negative relationships	negative relationships
none	On Post	none	negative relationships	negative relationships
none	Roadway Speed, Speed of Traffic, Driver Speed over Limit	none	positive relationships	positive relationships
none	Hearing Limitation	none	no relationships	positive relationships

hypothesis. Thus, there appears to be no support for the hypothesized relationship between cognitive aptitude test or composite scores and accident seriousness. Of the 27 bivariate correlations between the Had an Accident criterion and the cognitive aptitude scores, 11 were significant ($p<.05$). As hypothesized, higher cognitive aptitude was associated with a lower probability of an accident. However, none of these correlations were of a size one might consider meaningful. The number of significant findings was influenced by the considerable statistical power of the sample of 60,560 on this criterion.

The Spatial Aptitude hypothesis was not supported by the results. Table A15 shows no significant bivariate correlations between spatial test scores and any of the five criteria. In this case, the sample size of 489 for the first four dependent variables would have reduced the statistical power to detect a bivariate correlation of .15 ($p<.001$) to approximately 60%, whereas the power for Had an Accident would have been near 100%.

In contrast, bivariate correlations between psychomotor and perceptual motor test scores and accident criteria (Table A16) show some support for the Perceptual and Psychomotor Aptitude Accuracy hypothesis, but less for the Perceptual and Psychomotor Aptitude Speed hypothesis. The more correct responses on the Simple Reaction Time test, the fewer the fatalities on average, which supports the accuracy hypothesis. However, the longer the Simple Reaction median movement time, the fewer the fatalities and lower the severity classification tended to be, which is opposite the direction of the speed hypothesis. The more correct responses on the Choice Reaction Time test, the fewer injuries and fatalities there tended to be and the lower the severity classification, so the accuracy hypothesis is again supported. But, as on the Simple Reaction Time test, longer median movement times on the Choice Reaction Time test were related to fewer fatalities and lower accident severity classification, and this is in the opposite direction as that hypothesized.

The proportion correct on the Perceptual Speed and Accuracy test was negatively correlated with Had an Accident, although the bivariate correlation was small, and the mean of clipped decision times (mean decision time for correct responses only) had a positive bivariate correlation with Total Costs of accidents. Thus, in this case longer times were positively related to costs. The Cannon Shoot test had negative correlations with injuries and accident severity classification for its score based on the mean discrepancy between actual and optimal firing time (the difference between when a subject pushed a button to fire on a target and when the subject should have fired to be able to hit the target). This indicates that the larger the discrepancy between a soldier's actual and optimal firing times, the less severe his or her accident tended to be. The Short Term Memory, Target Identification, Number Memory, Target Tracking, and Target Shoot tests had no bivariate correlations with criteria that were significant ($p<.05$).

Composite Scores based on various combinations of the psychomotor and perceptual motor test scores had some significant relationships with the criteria. Perceptual Speed (combination of Short Term Memory test decision time, Perceptual Speed and Accuracy test decision time, and Target Identification Test decision time) was negatively correlated with Total Cost which indicates that soldiers with faster decision times had lower cost accidents. This supports the speed hypothesis. Perceptual Accuracy (combination of percent correct on Short Term Memory, Perceptual Speed and Accuracy, and Target Identification tests) had a small negative bivariate correlation with Had an Accident. The Basic Accuracy composite (combination of percent correct

on Choice Reaction and Simple Reaction Time tests) was negatively correlated with injuries, fatalities, and accident severity classifications.

In summary, although statistical power was not optimal for the sample of 494 on which the bivariate correlations for the first four criteria were based, several correlations provided support for the Perceptual and Psychomotor Aptitude Accuracy hypothesis, but support was mixed for the speed hypothesis. Soldiers' accuracy on these tests was often related to less severe accidents or less likelihood of having a USASC accident record. But, for soldiers' movement time, slower times on three measures (Simple Reaction, Choice Reaction, and Cannon Shoot tests) were related to less severe accidents, whereas slower movement times on the Perceptual Speed test and Perceptual Speed composite were related to higher cost accidents.

Temperament

Tables A17 through A20 provide evidence related to Hypotheses 4 through 10 on various temperament constructs, though little of the evidence supports the hypotheses. For example, on Table A17, the measure Energy Level is somewhat related to Impatience mentioned on the Type A hypothesis. On Table A17, the measures Dominance and Achievement Orientation and, on Table A18, the measures Ambition and High Expectations have some conceptual similarity to the construct of Competitiveness mentioned in the same hypothesis. None of these measures is significantly correlated with any of the five criteria except the High Expectations composite that is positively related to fatalities. The scale, composite, and factors for Cooperativeness are conceptually quite similar to the construct of Agreeableness, mentioned in the Agreeableness hypothesis. There were no significant bivariate correlations for any form of Cooperativeness. The Nondelinquency and Dependability scales, which represent the same construct, though in an opposite direction as in the Social Deviance hypothesis, also had no significant bivariate correlations with the criteria. Nor did the scale, composite, or factors for Internal Control and Locus of Control, which are more general constructs than those in the External and Internal Driving-Related Locus of Control hypotheses.

The closest measures to the construct in the Thrill Seeking hypothesis were the Rugged Individualism scale and the Rugged/Outdoors composite from the Occupational Interest inventory used in Project A. Results for these measures are shown in Table A19. Rugged Individualism, which asks how interested individuals are in engaging in adventurous, strenuous, and outdoor activities, was positively correlated with costs, injuries, fatalities, and the accident severity classification, providing support for the hypothesis. The Firearms Enthusiast scale also had positive bivariate correlations with all four of the accident severity criteria. The Rugged/Outdoors composite, which combines the Rugged Individualism and Firearms Enthusiast scales, was positively correlated with all four of the accident severity criteria, as well. This consistent pattern of correlations provides strong support for the usefulness of the Rugged Individualism scale and its composite.

There were no measures in the Project A database with which to test the Impulsivity hypothesis. The measures and composites for Conscientiousness and Work Orientation are closely related conceptually to the construct in the Conscientiousness hypothesis. Those bivariate correlations that were significant for Work Orientation were all positive, and, thus, in the opposite

direction of that hypothesized. The positive relationship between Work Orientation and accident severity is difficult to understand, given that the research literature has tended to show a negative relationship between Conscientiousness and accident involvement. The results on Table A20 for bivariate correlations between peers' and supervisors' ratings of soldiers' performance provide better support. Of the ratings most closely related to the construct of Conscientiousness, the Effort rating showed only a small, negative relationship with Had an Accident. However, the Following Regulations/Orders item and the Personal Discipline composite both showed negative correlations with fatalities, as well as with Had an Accident.

Bivariate correlations of Emotional Stability and Adjustment with the criteria are also in the opposite direction one would expect. The correlations suggest that the better one's adjustment, the more likely one is to have more serious accidents. And, the positive correlations for Stress Tolerance also seem opposite of what one would expect. Finally, the construct of Intellectance, which is best represented here by the Aesthetics measure on the AVOICE, shows only a small, negative bivariate correlation to support the idea that those higher on Intellectance are less likely to be involved in an accident. We do not suggest placing too much confidence in findings that are opposite to expected or logical directions. The findings may be due to some idiosyncrasies in the sample or differences between what the scales measure and the meaning of the constructs discussed in the hypotheses. We do not suggest developing any guidelines or recommendations on findings that are weak or contrary to expectations.

Driving Behaviors/History

The only bivariate correlations that are useful for examining the Risky Driving Behavior and Number of Tickets hypotheses are shown in Table A21. Minor Traffic Related waivers are not related to accident seriousness or involvement. Having a Misdemeanor Conviction or Minor Non-Traffic Related enlistment waiver is positively related to accident severity, and having a felony conviction is related to having an accident. Samples for most of the enlistment waiver categories are very small, so it is not surprising that fewer categories are correlated with criteria. The variable created to determine whether Having Any Waiver is related to accident seriousness or involvement should have better statistical power, but it was not related to any of the criteria.

The driver errors made at the time of an accident, according to the USASC accident records, could be correlated with only the four seriousness criteria. We have information only for those who had an accident. None of the bivariate correlations was of much significance, either statistically ($p<.05$) or practically. In summary, there was no support for the Risky Driving Behaviors or Number of Tickets hypotheses, and the hypothesis on Negative Attitudes About Driving Safety was untested in Study 1.

Transient Factors

A general comparison of the number of significant bivariate correlations for transient variables, relative to the number of significant correlations for the aptitude, temperament, and driving style variables, supports the idea that it is important to consider factors beyond just those that can be used in making selection decisions. Bivariate correlations for transient factors are shown in Table A22. Positive bivariate correlations of Weekend Hour with all four accident

seriousness criteria support Late Night/Weekend Driving Hypothesis. The negative bivariate correlations between Daylight driving and the criteria also lend support. In contrast, the negative correlations between Environmental/Weather Problem and three of the four criteria are in the opposite direction of that hypothesized. It may be that individuals are more cautious in inclement weather, and, therefore, have less serious accidents.

Soldiers appear to have less serious accidents on post, on duty, and while in field or tactical training. However, if one analyzes on duty accidents separately from the off duty accidents, bivariate correlations between field and tactical training are positive with accident seriousness criteria. The findings are a result of the fact that soldiers are not in field or tactical training when off duty, and many accidents are off duty or at times when training is not occurring. For on duty accidents only, involvement in field training is positively related to accident severity (r=.13, p<.05) and number of injuries (r=.09, p<.10), and involvement in tactical training is also positively correlated with severity (r=.15, p<.01) and number of injuries (r=.18, p<.01).

The age of soldiers involved in accidents was negatively correlated with injuries and fatalities, although positively correlated with the severity classification variable. There were no data for testing Hypothesis 16 in this study. The variable Hours of Sleep had considerable missing data and was a very weak test of the Sleep Deprivation hypothesis. Bivariate correlations for it provided no support for the hypothesis. Alcohol use at the time of an accident was positively correlated with all four seriousness criteria, which supports the Alcohol/Druge Use hypothesis.

As one would expect, use of seatbelts or other protective equipment was negatively correlated and the speed of the road on which an accident occurred was positively correlated with accident seriousness. Evaluation of bivariate correlations for the particular types of roadways shows that Street Accidents tended to be more severe than other accidents. Accidents in buildings or on parking lots tended to be less severe.

Interestingly, Vehicle Size was negatively related to accident seriousness. However, if one analyzes the on duty and off duty accidents separately, an explanation is found. Most off duty accidents are in POVs. POVs are most often automobiles. Given that people have more serious accidents off duty and off post and they are most likely to be driving POV automobiles when off duty and off post, smaller vehicles tend to have more serious accidents. When soldiers are on duty, Vehicle Size is positively related to the number of fatalities (r=.10, p<.05), and accidents in automobiles are related negatively to injuries (r=-.10, p<.05) and accident severity (r=-.12, p<.05), accidents in small trucks are related positively to injuries (r=.11, p<.05), and accidents in larger trucks are marginally related to more fatalities (r=.08, p<.10). Generally speaking, one could conclude that soldiers are safer while they are on duty and on post. Comparisons of bivariate correlations for on duty accidents and all accidents in the sample suggest there are few other differences between on duty accidents and other accidents.

Demographic/Control Variables

Bivariate correlations for demographic control variables are in Table A23. Based on these correlations, the physical characteristics and limitations included do not appear to be related to accident seriousness or involvement. Correlations for gender, when significant, were of low

practical or statistical importance. It may be that the unusual proportion of men and women in the Army decreases the relevance of gender as a predictor of accident involvement and severity. If a great majority of soldiers are male, gender is of little use in selection or prediction, even though national statistics indicate that young males are more accident prone than other age-gender groups. Marital status at the time of accession appears to have some relationship to accident cost or involvement even though varying amount of time may have passed between accession and the occurrence of soldiers' accidents. Those who were married tended to have lower cost accidents and be less likely to be in an accident; those who were divorced had higher cost accidents. Those who were single had a statistically significant positive bivariate correlation with Had an Accident, although the size of the correlation does not suggest practical importance. The racial/ethnic category of Whites was negatively correlated with Had an Accident, whereas the category Black was positively correlated with Had an Accident. In contrast, the correlations for Whites with Injuries and Severity were positive, while they were negative for Blacks. The variable Years of Education was negatively correlated with fatalities and severity.

Individual pay grade categories (E1 through E7) showed few significant bivariate correlations. Pay Grade, coded as a single variable with a range from one to seven, was positively correlated with costs and negatively correlated with severity of accidents. It may be that higher ranking soldiers can afford nicer vehicles and have higher cost accidents for that reason. But higher rank is generally correlated with older age, and the older, higher ranked soldiers may drive more safely and have less severe accidents, in spite of the tendency for higher cost accidents.

The variable, Driving MOS, which was created as a proxy for on-the-job driving time and exposure, was positively correlated with Total Cost and Had an Accident as expected, although the bivariate correlations were small. Of the individual MOS groups, Infantry soldiers tended to have more injuries and more severe accidents, though somewhat less likelihood of being in an accident. Military Police were more likely to be in an accident, but their accidents were less serious. Soldiers in Transportation MOS also were more likely to have had an accident and more fatalities and injuries in the accidents they had.

Preliminary Regressions

For the first four criteria, preliminary regressions were OLS regressions that analyzed a set of variables that had been entered simultaneously. For Had an Accident, the preliminary regressions were logistic regressions because the criterion is a dichotomous variable. The sets of variables in each regression were those for a group of tests or measures that were related. For example, Table A24 shows that a regression analysis was run for all ASVAB Scale Scores with each of the criteria. Separate regressions were also run for all ASVAB Composite Scores with each of the criteria, and so forth. Multivariate regression analyses can show different relationships between variables and criteria than found in bivariate correlations because interrelationships among the independent variables in the multivariate equation are taken into account in the analysis.

Values shown in the table are unstandardized regression coefficients and their standard errors. A one-unit increase on the predictor variable would be related to the amount of increase in the criteria shown in the regression coefficient. Thus, sizes of regression coefficients cannot be compared to one another without considering the underlying scales of the independent and dependent variables. The $\underline{R}^2$ values indicate the proportion of variance in the criterion accounted for

by the model. Logistic regression does not have a widely accepted statistic analogous to the $\underline{R}^2$ that indicates what proportion of variance on a criterion has been accounted for by the independent variables in a model. The χ-square statistic, which is used to test the overall significance of a logistic regression model, is included in place of the $\underline{R}^2$. Because all variables will be entered in preliminary regression equations, and we expect many of these individual variables to not have significant relationships to the criteria, the focus of the interpretation of the results of the preliminary regressions will be on the individual independent variables. We will interpret significant regression coefficients, even though the test for their total regression model is not significant. The focus here is on selecting independent variables of usefulness and testing them in larger regression models, and not on interpreting how much variance these preliminary regression models account for.

Aptitude Measures

Similar to bivariate correlation results, regression results show a lack of support for the Cogntitive Aptitude hypothesis, which predicted a positive relationship with accident criteria. Regression results for the spatial aptitude scales, shown in Table A25, also provide no support for the Spatial Aptitude hypothesis.

Tables 26 and 27 do show support for the Perceptual and Psychomotor Aptitude Accuracy hypothesis. For Choice Reaction Time, the proportion correct is negatively related to injuries, fatalities, and the severity classification. In addition, soldiers higher on the proportion correct on Perceptual Speed/Accuracy are not as likely to have had an accident.

Support for the Perceptual and Psychomotor Aptitude Speed hypothesis is quite mixed. For the Simple Reaction Time test, median decision time is positively related to Had an Accident, and Median Movement Time is positively related to injuries, fatalities and accident severity classification. These results are in the opposite direction of the bivariate correlation results, but are in the direction that was hypothesized. The median decision time and movement time for the Choice Reaction Time test are both negatively related to fatalities. These results are in the same direction of the correlation results, but opposite the direction hypothesized. On the Perceptual Speed tests, soldiers higher on Median Movement Time had more fatalities in their accidents. In the correlations, soldiers higher on Perceptual Speed Median Movement Time had higher costs, but their scores were not significantly related to fatalities. The regression coefficient is in the same direction as the bivariate correlation and the speed hypothesis. As in correlation results, the Short-Term Memory, Target Identification, Number Memory, Target Tracking, and Target Shoot tests showed little or no relationship to the accident criteria. The Cannon Shoot test again showed significant results: the Cannon Shoot test score was negatively related to cost and having had an accident. This is in the same direction as correlations, but with different criteria and in the opposite of the direction hypothesized.

Also similar to bivariate correlation results, several of the composites showed significant relationships with the criteria in the preliminary regressions. The Psychomotor composite (combination of Cannon Shoot time score, Target Shoot time to fire and log distance scores, Target Tracking 1 and 2 log distance scores, and pooled median movement time) was positively related to accident severity, which is opposite the direction hypothesized. The Perceptual Accuracy composite (combination of percent correct on Short Term Memory, Perceptual Speed and

Accuracy, and Target Identification tests) was negatively related to Had an Accident, which supports the accuracy hypothesis. The Short Term Memory composite was marginally related to Had an Accident, though not in the hypothesized direction. The Basic Speed composite was negatively related to Had an Accident, indicating that those with faster speeds on the Simple and Choice Reaction tests had fewer accidents. The Basic Accuracy composite (combination of percent correct on Choice Reaction and Simple Reaction Time tests) had a negative relationship with three of the five criteria: Injuries, Fatalities, and Severity. The results for Basic Accuracy are consistent across criteria, in both bivariate correlation and regression results, and with the accuracy hypothesis.

In summary, the regression results for the psychomotor and perceptual motor composites are not always in the same direction as in the bivariate correlation results or hypotheses. Based on the combination of the correlation and regression results, the Choice Reaction Proportion Correct score and Basic Accuracy composite look like the most promising instruments from the set of psychomotor and perceptual motor tests.

Temperament

Tables A28 and A29 show preliminary regression results for temperament measures, and Tables A30 through A32 show preliminary regression results for related measures. As with the bivariate correlation results for temperament and related measures, these regression results show limited support for Hypotheses 4 through 10.

The Type A hypothesis again receives no support. Those measures most highly related to impatience or competitiveness, which include the Energy Level, Dominance, Achievement Orientation, Ambition, and High Expectations scales on Tables A28, A29, and A30, are not significantly ($p<.05$) related to any of the criteria. Cooperativeness, which is the measure most relevant to the Agreeableness hypothesis, had only marginally significant ($p<.10$) relationships to two criteria. Nondelinquency, which is used to test the Social Deviance hypothesis, showed only a marginally significant ($p<.10$) coefficient with Had Accident. The Dependability composite and factor, also used to test the Social Deviance hypothesis, did not have significant relationships to the criteria. Internal Control and Locus of Control measures and composites showed no significant relationships to the five criteria and, therefore, no support for Internal and External Locus of Control hypotheses.

As in bivariate correlation results, the Rugged Individualism scale and Rugged/Outdoors composite both showed supportive evidence for the Thrill Seeking hypothesis. The scale score was positively related to the severity of accidents, although it had a marginally significant coefficient with Had an Accident, which is contrary to the hypothesized direction. The Rugged/Outdoors composite was positively related to injuries, fatalities, and accident severity, as expected. The AVOICE Aesthetics scale, which is the closest measure to Intellectance, does show a negative relationship with having had an accident, as one could expect based on past, albeit limited, research evidence.

In support of the Conscientiousness hypothesis, the Conscientiousness scale does have a negative coefficient with injuries, but the Work Orientation scale has marginally significant relationships to seriousness criteria that are in the direction opposite that hypothesized. Thus, the

hypothesis has no real support from the ABLE scales. It is supported, though, by the significant negative coefficients shown in Table A32 for the performance rating, Following Regulations/Orders. Those rated higher on following regulations and orders had lower cost accidents, fewer fatalities, and were less likely to have had a USASC accident record.

Results for school knowledge tests show some significant coefficients with accident seriousness and involvement criteria; however, the mixed pattern of negative and positive coefficients appears suspicious. It is difficult to explain and likely due to high intercorrelations among the three knowledge scores and a suppression effect. Additional analysis shows that no one knowledge test is significant when entered without one of the other knowledge tests in a model with other variables. Based on the additional analyses, we conclude that the significant coefficients for the knowledge scores in Table A32 have no useful meaning.

As before, in bivariate correlational results, Emotional Stability, Adjustment, and Stress Tolerance have a few scattered significant coefficients with criteria, but they are in the opposite direction of what would be expected based on the literature review or common sense expectation.

Driving Behavior/History

Regression results for enlistment waivers, shown in Table A33, indicate that misdemeanor and felony convictions have some significant positive relationships with the accident criteria in this sample, which is similar to findings in the bivariate correlation analyses. Driver errors recorded in the USASC accident records again do not appear to be useful explanatory variables.

Transient Factors

Weekend hour, being on duty, involvement in training, existence of an environmental/weather problem, road speed, vehicle size, and use of a POV are all significant ($p<.05$) or marginally significant ($p<.10$) in the multivariate analysis, shown in Table A34. Directions for the significant coefficients are the same as the directions on the bivariate correlation results. The only exceptions are coefficients for Vehicle Size, which are positive, whereas the bivariate correlations were negative. This change in direction makes sense when one considers the other variables included simultaneously in the same equations. The positive bivariate correlations for Vehicle Size seem to be explained by the fact that more serious accidents happen off post, off duty, and in POVs, which are most commonly automobiles. While controlling for On Post, On Duty, and POV at the same time as Vehicle Size, the simultaneous regression indicates that larger vehicles have more serious accidents.

In the multivariate equations for transient personal factors, Age at Time of Accident is not significant, but Alcohol Use and Seatbelt/Protective Equipment are significantly related to accident seriousness as expected. In equations for Type of Roadway, Country Road is used as the reference category. Street Accidents cost significantly more than Country Road Accidents, but accidents on other types of roads are not significantly more costly than those on country roads. Similarly, accidents in buildings or on parking lots result in significantly fewer injuries than Country Road Accidents, and accidents on all the other roadways are not significantly different from Country

Road Accidents with respect to number of injuries. The number of fatalities is significantly higher for Street Accidents, which also tend to be classified as more serious accidents.

The equations for Vehicle Type also use indicator variables. The reference category is Other Army Vehicle. Relative to the reference category, Motorcycles, Automobiles, and Small Trucks are involved in higher cost accidents and in accidents with more injuries and higher accident severity classifications, while other types of vehicles are not significantly different from Other Army Vehicles on these criteria. Automobiles are also in accidents with a significantly higher rate of fatalities than Other Army Vehicles. All other vehicle types shown are not significantly different on number of fatalities in accidents than the Other Army Vehicles.

Demographic/Control Variables

In multivariate equations with the set of demographic variables shown in Table A35, Years of Education, Height, Number of Dependents, Gender, Divorced at time of accession (relative to the married reference category), Any Enlistment Waiver, Driving MOS, and Racial Group (relative to the White reference category) were significantly related to one or more criterion variables. As shown in Table A36, relative to the E4 pay grade reference category, E1s, E2s, E3s, and E5s were significantly more likely to have an accident record.

As shown in Table A37, many MOS were significantly different in their relationships with the criteria than the reference category of Training/Miscellaneous. One could conclude that Armored, Engineer, Field Artillery, and Infantry soldiers tended to have more costly accidents than soldiers in other MOS. One could also conclude that Armored, Field Artillery, Infantry, and Ordnance soldiers tended to have a higher number of injuries in their accidents. Soldiers in Air Defense, Field Artillery, Infantry, Medical and Transportation MOS tended to have higher numbers of fatalities than other MOS. Soldiers in Aviation, Military Intelligence, Military Police, and Special Operations did not differ significantly in terms of severity than the reference group; but all the other MOS groups had significantly higher severity classifications. Military Intelligence, Special Operations, and Signal Corps soldiers were not different from the reference category, but all other MOS were significantly more likely to have a USASC accident record. Of course, the proportions of USASC accidents attributable to any particular MOS are a reflection of the driving behaviors of soldiers in the MOS, as well as the proportion of soldiers in the MOS in the total Army population. Unfortunately, data which would allow us to control for the proportion of soldiers in the various MOS groups were unavailable.

Final Regressions

A series of intermediate regressions were run that are not shown in tables. All independent variables that had been significant in either bivariate correlations or preliminary regressions were included in simultaneous regressions. These regressions combined sets of variables that had been significant and excluded those which had not been significant in preliminary regressions or correlations. By including any variable that had been significant in models with other variables that had been significant, we were able to determine which of the variables continued to be significant in multivariate models that included the full variety of different types of variables considered in this study. It is of course possible that using the analysis of a series of multiple models to select only those variables that remain significant could cause us to capitalize on chance in selecting the

variables that remain in the final models. However, the ability to look across the results for different criteria, and to compare results for many variables from Study 1 and Study 2, helps reduce the potential for interpreting results which are merely the result of capitalization on chance. Variables that have a consistent pattern of relationship across different criteria and samples can be interpreted with confidence.

Total Cost of Accidents

Table A38 shows the Final Regression for Total Cost. Of all independent variables that had been significant in bivariate correlations or preliminary regressions, only those on Table A38 continued to be significant when combined with all other significant variables in the study. Thus, this table represents the "best" regression model for this criterion based on all the possible variables considered in the study. The first step in the hierarchical regression model includes independent variables that could be used for selecting drivers. The second step includes other driving behavior, transient, and control variables that could be useful in developing guidelines for helping soldiers reduce their accident risk.

Of all selection variables, only the Perceptual Speed Composite and AVOICE Rugged/ Outdoors Composite were significant. Soldiers who were faster on Perceptual Speed (had higher scores) had lower cost accidents, while higher Rugged/Outdoors scores were related to higher costs. Once remaining significant variables were added in Step 2, directions for Perceptual Speed and Rugged/Outdoors did not change. Those married had lower cost and those divorced had higher cost accidents than soldiers who were single at accession. Unfortunately, we did not have data on marital status at the time of the accident. Accidents occurring during weekend night hours were more costly, and larger vehicles were involved in lower cost accidents (taking into consideration the other variables in this model, which did not control for POV, on/off duty, or on/off post). Selection variables accounted for 3% of the variance in accident costs. The transient and control variables accounted for an additional 4%. The combined set of variables accounted for 7% of the variance.

Number of Injuries in Accidents

Table A39 shows that a different Perceptual Motor test, Choice Reaction Proportion Correct, was negatively related to the number of injuries. The AVOICE Rugged/Outdoors Composite was positively related to injuries, as it had been with costs. Together these two variables accounted for 3% of variance in the number of injuries. Transient and control variables that were significant included the accident occurring during daylight hours, which was related to fewer injuries. The larger the vehicle, the fewer the injuries in an accident, on average. And if an Environmental/Weather problem existed at the time of the accident, an accident tended to have fewer injuries. Significant ransient and control variables accounted for an additional 5% of variance. The two sets of variables combined accounted for 7% of the variance.

Number of Fatalities in Accidents

Table A40 shows the final regression for the number of fatalities. Once again, the Rugged/Outdoors Composite had a positive relationship with the criteria. In addition, the Choice Reaction Proportion Correct and Simple Reaction Median Movement Time were negatively related

to fatalities. This indicates that soldiers who were slower on the Simple Reaction Test had fewer fatalities. The Perceptual Speed Movement Time had a positive relationship with fatalities (i.e., those with slower speeds had more fatalities in accidents). The direction of the speed scores' relationships to fatalities could be due to a difference in types of movement and their relationships to accident severity, or it could be due to idiosyncrasies of relationships between highly related variables in this particular data set. The meaning of relationships for the two movement time variables should be interpreted with caution.

The Stress Tolerance Factor Score was also positively related to fatalities. It is possible that those who are particularly high on stress tolerance ignore factors that could cause accidents to be more serious. Perhaps, they are not stressed by danger signals while driving and do not attend to them to the same degree as the soldier who is average or below on Stress Tolerance.

The selection variables in Step 1 of this model accounted for 7% of variance in the number of fatalities. The transient and control variables added in Step 2 accounted for an additional 3% of variance. All variables included in the model accounted for 10% of the variance. Once again, accidents were less severe if they occurred during daylight, and if there was an environmental or weather problem at the time of the accident.

Severity Classification of Accidents

Table A41 shows that perceptual tests, the Rugged/Outdoors composite, and the Stress Tolerance temperament factor score are again predictive of the seriousness of accidents. In this case the criterion is the Army's mishap classification code. The classifications are coded from one, for the most serious accidents that are termed Class A accidents, through four for the least serious accidents that are termed Class D accidents. The negative coefficient for the Choice Reaction Test indicates that those who got higher proportions of answers correct on the test tended to have accidents with lower-level severity classifications. Higher median movement times on the Perceptual Speed test, higher scores on the Rugged/Outdoors composite, and higher scores on Stress Tolerance were all related to higher severity. The selection variables alone accounted for 7% of the variance in severity. Adding transient and control variables to the model provided an increment of 11% to the variance accounted for. Together the selection, transient, and control variables accounted for a total of 18% of the variance. Among transient and control variables that provided additional information for predicting severity, Years of Education, Daylight hours, Vehicle Size, and existence of an Environmental/Weather problem were all negatively related to accident severity. Accidents that occurred during weekend night hours were more severe than those at other times.

Accident Involvement

Models predicting whether or not a soldier had been involved in an accident recorded in USASC records were based on the use of logistic regression and Cox event history analysis because the accident involvement criterion was dichotomous. Because less than 2% of the sample had more than one accident record, the sample was inadequate for analyzing anything other than the accident/no accident criterion.

Logistic regression. Table A42 shows that three variables useful for driver selection were significantly related to accident involvement in the final logistic regression model. The proportion of correct items on the Perceptual Speed instrument and the performance rating at the end of training on Following Regulations and Orders were both related to lower likelihood of having an USASC accident record as a driver. The end-of-training Physical Fitness performance rating was positively related to the likelihood of having a USASC record. There is no widely accepted statistic analogous to the $\underline{R}^2$ for multiple regression that indicates the amount of variance in the criterion accounted for by the independent variables in a logistic regression model. The program used to calculate the logistic regression model (SPSS) does provide a partial correlation, shown in the third column of numbers that indicates the relative validity of the independent variables. Each of the three variables accounts for less than 1% of the variance in the accident criterion.

The last column of numbers in Table A42 shows the log odds of accident involvement for each one-unit change on the independent variable. So, for example, a person who had 87% of items on the Perceptual Speed measure correct had .99 the odds of having an accident record as a person who had 86% of items correct. The mean proportion correct on the Perceptual Speed measure was .86 (see Table A4), with a standard deviation of .09 for the total sample of soldiers. The mean proportion correct was two points lower, or .84, for the sample of soldiers who had at least one accident record. A soldier who received a performance rating of 5, which was near the mean of 4.43 on Following Regulations/Orders (see Table A8), had .80 the odds of having an accident record compared to the soldiers who had received a 4 rating. For each one-level increase on the seven-point scale for the Physical Fitness rating, a soldier's odds of having an accident record increased 15%. A soldier whose rating was two levels higher than another soldier's had 32% higher probability (1.15 x 1.15) of having an accident record.

Event history analyses. A set of preliminary event history regressions using Cox regression were conducted with each set of independent variables in a series of models like the preliminary regression and logistic models shown in Tables A27 through A40. Event history models provide the advantage that they take into account how long individual soldiers had been in the Army. In a logistic regression model, if a soldier had been in the Army and our database, for six months and had an accident record this case would be treated similarly to that of a soldier who had been in the Army and database for six years and had one accident record. In contrast, event history models consider the amount of time during which a soldier could have potentially had a accident that would have qualified for a USASC accident record (Allison, 1995).

A final Cox regression event history analysis model was conducted based on results from preliminary and intermediate event history models that were used to see which independent variables remained significant when combined with the full set of other potential predictors. Table A43 summarizes the results of the final, or "best," event history model for predicting whether or not a soldier had an accident record. The independent variables that were significant in the Cox regression were mostly different from those that were significant in the logistic regression model. The results show that those who were single were significantly more likely to have a USASC record than the reference category of those who were divorced at accession. Those who were married were not significantly different than those who were divorced at accession. Older soldiers were less likely than younger soldiers to have an accident record following their accession (when they first entered the database); however the regression coefficient, in the first column of numbers, and the

expected value, shown in the last column, indicate that the age difference was very slight. There was only a .0001 drop in the odds of having an accident record for a one-year increase in age. The Aesthetics interest scale had a negative and the Law Enforcement interest scale had a positive relationship with the criterion.

Similar to logistic regression results, results for the Cox regression showed the Following Regulations/Orders rating to have a negative and the Physical Fitness rating to have a positive relationship with accident involvement. The rating on Following Regulations/Orders stands out as having the strongest relationship with the accident involvement criterion—it has the largest partial correlation and shows that a one-level increase on the rating is associated with a .25 drop in the odds of having an accident record. It also had the largest partial correlation and a similar odds ratio in the logistic regression, thus showing consistency across methods of analysis.

Summary of Results for Study 1

Table 1 summarizes results of the hypothesis tests for Study 1. The Cognitive Aptitude and Spatial Aptitude hypotheses received no support in bivariate correlations or preliminary regressions. Cognitive and Spatial Aptitude measures were not included in the final regression or event history models.

Bivariate correlation and preliminary regression analyses both provided some support for the Perceptual and Psychomotor Aptitude Accuracy hypothesis, but support for the speed hypothesis was mixed. Supporting the accuracy hypothesis, the Simple Reaction, Choice Reaction, and Perceptual Accuracy proportion correct scores and the Perceptual Accuracy, Basic Accuracy, and Psychomotor composite scores all showed negative relationships with accident criteria in either or both of the bivariate correlation and preliminary regression analyses. In final regressions, the Choice Reaction proportion correct and Perceptual Speed proportion correct scores were both negatively related to accident criteria.

Median movement time scores for the Simple and Choice Reaction tests and the time discrepancy score on the Cannon Shoot test were all negatively related to accident criteria in bivariate correlations. This was opposite the direction hypothesized, such that slower respondents had less serious accidents. The Perceptual Speed composite score was negatively related and the Perceptual Speed mean of clipped decision times was positively related to accident costs, so these were both in the hypothesized direction (speed composites were scored in the opposite direction of speed tests; these results indicate faster respondents had less costly accidents). The direction of relationships for the Simple Reaction median movement time and Perceptual Speed median movement time were in the direction hypothesized, whereas the direction of relationships for the Cannon Shoot time discrepancy scores and Choice Reaction median decision and median movement time scores were in the opposite of the direction hypothesized in the preliminary regressions. In final regressions, the Perceptual Speed composite was negatively related to costs, and Perceptual Speed median movement time was positively related to fatalities and severity. These relationships are in the hypothesized direction. But, the Simple Reaction median movement time was negatively related to fatalities, which is opposite the direction expected. Thus, evidence regarding the speed hypothesis was very mixed.

Evidence related to the Type A, Agreeableness, Social Deviance, and Internal and External Driving-Related Locus of Control hypotheses provided no support or very weak support for the relationships of the temperament variables with accident criteria. Stress tolerance, for which there was no hypothesis, was positively related to seriousness of accidents. Results for the Rugged Individualism score and Rugged/Outdoors composite support the expectation expressed in the Thrill Seeking Hypothesis. There was no evidence in Study 1 related to the Impulsivity hypothesis, and evidence on the Conscientiousness hypothesis was mixed. The Conscientiousness and Work Orientation measures did not support the hypothesis. However, the performance rating on Following Regulations/Orders and the rating composite, Personal Discipline, both showed strong negative relationships with criteria and support for the Conscientiousness hypothesis.

The Risky Driving Behavior hypothesis was not supported: Driver errors were not related to accident criteria. The enlistment waiver data used to test the Number of Tickets hypothesis showed no relationship between waivers for traffic-related offenses and accident criteria. The waiver data did show positive relationships between misdemeanor and felony waivers with accident criteria in both bivariate correlation and preliminary regression analyses. There were no data with which to test the Negative Attitudes Toward Driving Safety hypothesis.

Results in bivariate correlations, preliminary regressions, and final regressions for the relationship between environmental/weather conditions and accident criteria were all negative, and so in the opposite direction of that hypothesized. Results in all three types of analyses supported the hypothesis that late night driving on weekends would be positively related to the accident criteria.

There were no data for testing the hypothesis on the influence of stress on accident involvement and too much missing data on the hours of sleep variable to test the sleep deprivation hypothesis. The Alcohol/Drug Use hypothesis was strongly supported in both bivariate correlation and regression analysis, but it was not a variable remaining in final regression or event history models.

Several variables, for which there were no formal hypotheses, also showed significant relationships with the accident criteria. Age showed a negative bivariate correlation with injuries and fatalities, whereas it showed a positive relationship with costs. Age at the time one first accessed or entered the database was negatively related to the likelihood of having a USASC accident record at some point after accession in the final event history analysis. This is consistent with the well-publicized national relationship between youth and greater likelihood of accident involvement. Similarly, higher ranking soldiers tended to have fewer injuries, fatalities, and accidents and less severe accidents, although they had higher cost accidents. Age and rank are significantly correlated, so it is not surprising to see a negative relationship between rank and the accident criteria.

Women tended to have lower cost and less severe accidents and less likelihood of being in an accident, based on bivariate correlation results, and lower cost accidents, based on preliminary regression results. This is also consistent with national statistics on relationships between gender and accident criteria. However, gender was not a factor in final regression and event history analyses. These results suggest that the relationships between gender and the accident criteria are mediated by other variables included in the final regression models. Regression and logistic

regression results also suggest that relationships between age and the accident criteria are mediated by other factors. But, the results from the event history model indicate that age may not be entirely mediated by other factors.

Bivariate correlation and multiple regression results suggest that those soldiers who were married at accession would later have less serious accidents than those who were divorced or single at accession. Those with more years of education at accession had fewer fatalities and less severe accidents than those with less education, according to both correlations and regressions. Bivariate correlation results indicated that Whites in this sample had more severe accidents, but were less likely to have had a USASC accident record. In contrast, Blacks in this sample had less severe accidents, but were more likely to have had a USASC accident record. This pattern was also found in preliminary regressions, but race/ethnicity was apparently mediated by other factors and did not appear as significant in final regression or event history models.

Results indicate that soldiers have less severe accidents on post and on duty and more severe accidents while in field or tactical training on duty. Use of seatbelts/protective equipment shows a consistent negative relationship with accident seriousness, while road speed shows a positive relationship with accident seriousness. Automobile drivers have more serious accidents when off duty, whereas drivers of trucks have more serious accidents when on duty. Those in MOS which we guessed were highest on driving duties (labeled "Driving MOS") did have more positive relationships with accident costs and involvement.

Final regression models were not able to account for large proportions of variance in the accident criteria. A total of 7% of variance could be accounted for with the models predicting costs and injuries. Ten percent of variance could be accounted for with the model for predicting fatalities, and 18% of variance was accounted for by the model for severity. In the cost, injuries, and severity regression models, the increment in the proportion of variance accounted for by transient and control variables was greater than the proportion of variance accounted for by selection variables alone. These results support the earlier contention that accident criteria are difficult to predict, and that transient and control variables should be considered, in addition to selection variables, if one wishes to understand influences on accident involvement and severity.

STUDY 2—NEW DATABASE STUDY

Method

Sample

A sample of enlisted soldiers currently in the Army was used in the second study. USASC statistics indicate that at least 89% of POV accidents among military personnel involve enlisted soldiers as drivers (USASC, April 27, 1998). Therefore, to simplify the request for troop support for this study, commissioned officers were not requested. Data needed to be collected from a large enough sample of soldiers to provide adequate statistical power to detect significant differences in both bivariate correlational and multivariate analyses. Multivariate regression analyses involved in this study included many variables entered simultaneously, and multiple significance tests were involved in the overall study. We estimated the sample size needed to provide adequate statistical power for multivariate regression analyses and to provide adequate power to prevent high levels of

total study-wise error in significance tests. Based on the statistical power analysis our goal was to obtain a sample of at least 700 soldiers to achieve statistical power of about 90% in logistic regression analysis (using α=.001 because of the considerable number of statistical tests involved in the study).

In addition to sample size, another factor which affects statistical power for analyses with a dichotomous dependent variable like having/not having an accident are the proportions in the sample who have and have not had the event represented by the dependent variable occur. Of the 60,650 soldiers in the Project A sample used in Study 1, only 1.2% had a USASC accident record. A split of 2% versus 98% for those who have versus those who have not had an accident could severely restrict the statistical power of analyses in a sample of several hundred subjects. For example, statistical power for a sample of 700 soldiers if 10% had an accident record and 90% did not would be approximately 42%.

To provide the greatest possible statistical power in analyses, we set the goal of trying to have a sample with a 50/50 split of accidents/no accidents. For a sample of 700 soldiers, a 50/50 split would provide approximately 95% statistical power. We used USASC records of soldiers who had accidents during the years 1993 through 1998 to identify half of our intended sample. The other half of our sample was to be soldiers who did not have accidents recorded in the USASC database. Although some of this "control" sample was expected to have had accidents that had not been recorded in USASC records, we also expected that our control sample would provide many soldiers who had no accidents.

This was a roughly stratified sample rather than a random sample. We asked the military installations included in our study to provide a matching soldier with similar rank, MOS or unit, and gender for each soldier we identified from the USASC accident records. Often, the soldiers identified by name and SSN from the USASC accident records were not available because of current assignments, having left the Army, permanent change of station, or because they did not show for the data collection. We attempted to fill their slots with another soldier from the same unit whenever possible in order to achieve our sample size goal, even if we might be unable to achieve our goal of a 50/50 split on the accident criterion.

Table B1 in Appendix B shows descriptive statistics for our sample and the dependent variables used in Study 2. Although we were not able to reach our goal of a sample size of 700, we collected data from 551 soldiers who had an average of .63 accidents each. Nearly 40% (39.6%) of the sample had at least one Self-Report Accident, 22.7% of the sample had at least one Safety Center accident, and 46.8% of the sample had at least one of either type of accident report. So, we were able to reach the goal of a nearly 50/50 split on the accident criterion variable, even though our sample size did not meet our goal. With the sample achieved, statistical power in logistic regression analyses was approximately 85% and the statistical power to detect a bivariate correlation of .15 was about 68%.

The military installations included in the data collection were Ft. Carson, CO, Ft. Riley, KS, Ft. Hood, TX, Ft. Stewart, GA, and Ft. Bragg, NC. HumRRO and ARI personnel traveled to the data collection sites to collect the data during the months of June through September, 1998. Data were collected in half-day sessions. Each soldier received an envelope of materials including a

Privacy Act Statement that explained that participation in the study was voluntary. Two soldiers opted not to participate in the study after reading the Privacy Act Statement.

The envelope also contained all instruments and response forms to be used during the data collection. Because of the considerable variation in the speed at which individual soldiers completed forms, and because of the early or late arrival of many soldiers, the soldiers were allowed to complete several of the forms at their own pace. The two data collectors present in each session were able to provide enough individual attention to soldiers to ensure that they were following instructions and not working on instruments which required timing or group participation (e.g., the Waypoint test required timing how long it took the fastest individual to complete a page, stopping all soldiers completing that page when the first one finished, and then recording that time for all individuals who had taken the Waypoint at the same time). Sessions, on average, included 15 soldiers, although they ranged in size from 1 to 40 soldiers. A variety of minor problems occurred during data collection sessions, but these rarely required an instrument or individual to be dropped from the sample.

The average age of the soldiers in the sample was 26.9, and the average rank was E4. The sample had an average of 12.5 years of education and 10.5 years of driving experience. Fourteen percent of the sample was female, 62% were White, 25% were Black, and 13% were of Other Race/Ethnicity. The MOS groups with the highest proportions in the sample were Armor (16%), Engineers (10%), Field Artillery (9%), Mechanics (9%), Quartermaster (13%), and Transportation (7%).

Criterion Variables

The sample of 551 soldiers who completed data collection sessions and provided analyzable data had an average of .23 Safety Center Accidents and .52 Self-Reported Accidents. Data for Safety Center Accidents were obtained from the USASC for all active Army soldiers who had an accident record from 1993 through mid-1998. These records provide considerable detail on the accident, including total costs, number of injuries and fatalities, number of work days lost, and the Army's severity classification for each accident. The accident records obtained from the USASC and the data fields they included were identical to those in Study 1.

We also asked each respondent to complete one Driving History Form and an Accident Record for each accident they had had in the five years prior to the date of data collection. From these forms we were able to obtain soldiers' self reports of the number of accidents they had had in the period that approximated the period for which we had USASC accident records. We also obtained soldiers' reports of the costs of the accidents, whether or not a fatality occurred, the level of seriousness of injuries in the accident, and the number of work days the soldier lost. By using the definitions for the Army's severity classifications for accidents, we were able to use cost, fatality, injury, and lost work days to classify each self-reported accident in the four-category classification system (i.e., Classes A through D, coded 4 through 1).

We created a database which combined Safety Center and Self-Report Accident records so that an accident that was recorded in both the safety center and self-report records was not counted twice in the total number of accidents reported for an individual soldier. We did this by selecting the accidents for soldiers who had both a USASC and Self-Report Accident. We then listed key data that

could be used to describe the accident and/or which the soldier would be likely to have remembered correctly (e.g., year of accident, type of vehicle in which the accident occurred). We went through the variables for each accident to determine whether the accident in a self report was the same as the one in a USASC record. Given the number of descriptive variables for accidents, we were confident in our ability to do this for over 95% of the cases. In the rare cases in which we could not be sure two accident reports were describing the same accident, we treated both as different accidents. There were a total of 127 safety center accident reports and 285 self-reported accidents. Of these, 97 safety center and self-report records represented the same accidents. The total number of complete accident records, without double counting, was 309.

When a variable used as a criterion, predictor, or control was described in both the USASC and self-report records, USASC data were used. Some variables were described only in the self-report Accident Report forms, and not in USASC records, so for these the data from the Accident Report forms were used. Based on the combined USASC and Self-Report Accident database, we identified eight criteria for use in Study 2, as shown in Table B1.

Total Cost was the cost of the accident based on USASC data, if available, and based on self-report data when the accident was only in self-report information. The average Total Cost was slightly less than $11,000, which is half that for the accidents in Study 1. We would expect accidents in Study 2 to be less costly and less severe since they include self-reported accidents that were not serious enough to lead to their inclusion in the USASC database.

Thirty-four percent of accidents involved an injury or fatality in the driver's vehicle. This criterion differs from the Number of Injuries and Number of Fatalities criteria used in Study 1. Because of the way questions were worded on the self-report Accident Report forms, we only obtained data on self-reported accidents regarding whether there was a fatality or injury in an accident. We did not collect the total number of fatalities or injuries in accidents on the self-report forms. Work Days Lost was not used as a criterion in Study 1, but it was included in Study 2 since it is one of the factors that influences the Army's classification for the severity of an accident. Lost work days resulting from soldiers' vehicular accidents have an economic cost for the military. The Severity variable is the same as that used in Study 1. It represents the four AMC categories, from Class A to Class D, used to signify how severe an accident was. Class A is coded 4, for most serious, Class B, 3, Class C, 2, and Class D, 1. Self-reported accidents which did not satisfy the criteria for at least a Class D accident were coded 0. Accidents in Study 2 have lower severity classifications, on average (1.20), than accidents in Study 1 (1.95).

Whereas in Study 1 there were too few individuals with more than one accident to analyze, in Study 2, there were more individuals with multiple accidents so we could study the number of accidents, rather the dichotomous criterion of had/did not have an accident. In this sample, 22.3% of the soldiers had one Safety Center Accident and 0.4% had two Safety Center Accident records; 31.2% of the sample had one Self-Report Accident, 6.2% had two, 1.6% had three, and 0.4% had four. One individual self-reported ten accidents that fit within the time period relevant to this study, while that individual had two Safety Center Accident records. The accident records for that individual were reviewed in detail, but no signs of irrelevant reports or irregularities in the data were found.

An item on the self-report Accident Report form asked whether the soldier was completely, partially, or not at all responsible for causing an accident. This information and data in USASC accident records were used to code an accident as either at or not at fault. Of the 309 total accidents, 170 were at fault. In self-reports, the soldiers indicated 19.0% of the accidents were completely the soldier's fault, 20.8% were partially the soldier's fault, and 60.2% were not the soldier's fault. Fewer of the USASC accident records indicated that the soldier had made no error and, therefore, could be considered not at fault. These data indicate the soldiers are less likely to attribute the cause for an accident to their own fault, while third parties (e.g., those completing accident reports or entering data at the USASC) are more likely to attribute the cause of the accident to the soldiers' fault. The Total At-Fault Accidents criterion should be interpreted with this knowledge of the differences in sources of the data in mind.

Because individual soldiers could have accessed into the Army at different points in the previous five years (the period for which accident data was collected), and because some had not been driving for the entire five years, we adjusted the four number of accidents criteria. We divided the number of Self-Report, Safety Center, Total, and Total At-Fault Accidents for an individual by the number of days that individual could have potentially had an accident. For many this was the entire five-year period, but for others it was since the time they had received their driver's license, which was during the five-year period. For all remaining analyses, except the event history analyses for Study 2, the four criteria on number of accidents have been adjusted for the amount of time in which soldiers could have potentially had an accident. The number of Self-Report Accidents per day was .00029 (SD=.00047), the number of Safety Center Accidents per day was .00013 (SD=.00024), the number of Total Accidents per day was .00036 (SD=.00050), and the number of Total At-Fault Accidents per day was .00017 (SD=.00036).

Predictor Variables

Aptitude Measures

As in Study 1, the standardized ASVAB Subtest and Composite scores and the AFQT scores were used as measures of cognitive aptitudes. Data were not available for Factor scores, as in Study 1. Table B2 shows the means and standard deviations for this study based on treating individual soldiers as cases and based on treating individual accidents as cases.

Spatial aptitude was measured with five of the six paper-and-pencil tests included in the Project A Experimental Battery and analyzed in Study 1. Descriptive statistics are shown in Table B3. Because of the length of the Assembling Objects test, the length of the total battery to be administered in Study 2, and the expectation that this test would not provide incremental value above the other instruments included in the battery, the Assembling Objects test was omitted from the Study 2 battery of instruments.

Table B4 shows descriptive statistics for the Waypoint test (Cantor, in press). We used the Waypoint test to tap perceptual and spatial aptitudes. The Waypoint test is a four-minute, nonverbal test that has been used to identify collision-prone drivers by some private employers. This test is based on the concept of "channel capacity," which refers to the individual's peak rate of processing visual information. It is also based on the concept of "situational awareness," which includes the

ability to see an entire visual scene, sustain one's attention, and detect details embedded in a field of visual "noise" (e.g., notice a stop sign at a busy intersection) (Cantor, in press). This latter aptitude is conceptually similar to the idea of field independence/dependence.

The three scores shown in Table B4 include the channel capacity score and the channel capacity score transformed into nine norm group categories. The highest norm groups are hypothesized to have greater risk of accident involvement. The Waypoint Risk Group is a dichotomous score which is coded two if an individual is considered at high risk of being in an accident (top 15% or higher of scores based on the score database used to create the norm groups) and one if an individual's score indicates they are in the bottom 85% in terms of accident risk. In this sample, 22.0% had a Waypoint Risk Group score of two, which is somewhat higher than the 15% for the norming sample.

The norms and algorithms from which these values come were developed by Dr. Michael Cantor. The formulas and the test are the intellectual property of Dr. Cantor, and cannot be reproduced or presented in further detail here. The Waypoint Risk Group value is the value from the Waypoint test which is given to organizations to predict which employees are most likely to be involved in an accident. No other tests representing perceptual or psychomotor aptitudes could be included in this study due to the time and expense of their administration.

Temperament Measures

Temperament was measured with the Assessment of Individual Motivation (AIM), developed by Army researchers, and additional measures, developed for this particular study. The AIM is a 27-item forced-choice measure of temperament based on the ABLE. Scales have been identified to measure Agreeableness, Conscientiousness, Adjustment, Dominance, Work Orientation, Physical Condition, Adaptability, and Social Desirability. Descriptive statistics for these scales are shown in the second section of Table B5. The Agreeableness measure was used to test Hypothesis 5 and the Work Orientation measure was used to test Hypothesis 10.

The literature review included a search for acceptable established measures for the other temperament constructs that are of interest in this research; however, it was often necessary to modify currently existing measures because of problems with the current measures. All of these newly developed or adapted measures are self-report instruments that were administered to soldiers in paper-and-pencil form on the Driving-Related Attitude and Behavior Inventory. Temperament measures developed for this study use five-point Likert scales, with one indicating lowest agreement ("disagree very much") and five indicating highest agreement ("agree very much") with an item.

Type A subscales of impatience and irritability were measured using items developed by Spence et al. (1987). Items used to measure competitiveness, polyphasic behavior, aggression, and improper planning were based on modifications of items from other measures of Type A (Edwards et al., 1990; Gerbing, Ahadi, & Patton, 1987; Hellriegel et al., 1995). Modifications were made to try to strengthen the subscales and improve their measurement properties; popular measures of Type A are considered to have several weaknesses with regard to their content validity and measurement qualities (e.g., reliability, dimensionality) (Edwards et al., 1990; Houston & Snyder, 1988; Powell,

1987). Principal components and common factor analysis with varimax rotation were used to identify the number of factors present in the total set of Type A items and the items which loaded strongly enough on factors to be included on scales. The coefficient alpha measure of internal consistency was reasonably high for research purposes (Nunnally & Bernstein, 1994) for all of the scales identified in factor analysis: Impatience (.75, 6 items), Competitiveness (.82, 2 items), Irritability (.83, 2 items), Polyphasic Behavior (.79, 4 items), Type A Total Scale (.80, 16).

All scales developed for this study sum the values from the items on the scale and divide the value by the number of nonmissing items. Scale values are computed for an individual if that person has 75% or more of the items completed.

We originally intended to test Social Deviance hypothesis with a measure used in previous accident studies; however, the measure was subsequently deemed to be too sensitive for use with soldiers because it asked soldiers to rate the likelihood they would engage in certain illegal or immoral behaviors. Therefore, the only measure used in Study 2 that is similar to the Social Deviance construct is the AIM Dependability measure, which measures the reverse of the Social Deviance construct. The Dependability scale from the AIM primarily measures nondelinquency.

To test the Internal and External Driving-Related Locus of Control hypotheses, we used items from Montag and Comrey's (1987) scales of Driving Internality and Driving Externality. They presented evidence of acceptable development methods and measurement properties on these scales. Because of the length of their scales and the repetitive nature of their items; however, we chose to shorten their measure. We dropped items that had the weakest loadings in their factor analytic results. Our factoring of the Locus of Control Scales supported a two-factor solution; however, not all items loaded on the factor on which it did in Montag and Comrey's study. Of the 21 items included here, four were dropped because they cross-loaded on both factors or loaded on the wrong factor. In addition, the coefficient alpha internal consistency was quite low for the external locus measure: .76 for driving-specific internal locus (11 items) and .63 for driving-specific external locus of control (7 items).

To test the Thrill Seeking and Impulsivity hypotheses, we modified instruments of Gerbing et al. (1987). Their scales were based on careful factor analytic work that looked at the interrelationships among several temperament scales from already established inventories (e.g., MMPI, 16PF). The instruments combine items from different inventories to create temperament factors and subscales with acceptable measurement properties (e.g., high coefficient alphas, good fit in confirmatory factor analytic models, acceptable loadings in exploratory factor analysis). A factor analysis of the Thrill Seeking and Impulsivity items included in this study supported four factors with acceptable coefficient alphas: Restless (.77, 4 items), Risk Taker (.85, 4 items), Lively (.81, 4 items), Impulsive (.75, 11 items), Impulsivity Total Scale (.83, 24 items).

<u>Driving Judgment, Behavior, Attitudes, and History</u>

<u>Driver judgment tests</u>. The first four scores described in Table B6 are based on two instruments developed by ARI researchers. These were designed to measure soldiers' ability to judge the need for speed reduction under particular driving conditions and the percentage of accidents that can be attributed to various causes. Two judgment scales were developed and scored

in accordance with a consensus-based procedure that has been used to evaluate performance on a variety of tacit and unobtrusive knowledge tests (Legree, 1995; Mayer, Caruso & Salovey, in press; Sternberg & Wagner, 1993). The tests were developed based on the notion that the knowledge structures of high versus low crash risk drivers differ, and that these differences would be evidenced by the precision with which individuals could estimate the relative level of danger associated with a variety of road hazards and driving conditions. It was expected that high-risk individuals would tend to either over- or underestimate the danger associated with hazards and/or road conditions. It seemed reasonable that a tendency to either over- or underestimate the importance of road hazards would decrease an individual's ability to appropriately respond to adverse driving conditions. We therefore felt that individuals who provided poorer responses would be more likely to be involved in accidents than those who provided more optimal responses.

The two scales contained a number of standard environmental items that correspond to the type of information usually presented in driver education classes (e.g., slow down in inclement weather). The scales also incorporated a number of internal items addressing an individual's ability to introspect and respond appropriately when confronted with internal affect or health considerations. The affective items leveraged recent revisions to the conceptualization of emotional intelligence as a set of knowledges or abilities that allow individuals to control and respond more appropriately to internal conditions (Mayer et al., in press). Thus the content of the scales allows a limited evaluation of these constructs (i.e., emotional knowledge and emotional intelligence) against accident involvement.

The Safe Speed Knowledge Test presented a scenario requiring participants to assume that an individual was driving a safe car under optimal conditions. The participants were required to indicate how much the individual should slow down to ensure safety given 14 conditions. The 14 conditions served as test items and required independent responses. Ten of the items referenced environmental factors (e.g., snow or rain) and four of the items referenced internal affective/health states (e.g., stress or illness). One item referenced an internal state (i.e., anger), as well as an environmental factor (i.e., light rain). The Accident Causation Test required individuals to estimate the percentage of major accidents that involved 14 conditions. These conditions referenced a variety of environmental factors (e.g., road condition and weather) as well as several characteristics specific to the driver (e.g., age and stress). The two scales are contained in Appendix C under the title "Driving Related Attitude and Behavior Inventory II."

The method used to score the driving knowledge tests is dissimilar from those used to score most tests. The procedure produces an interval datum for each item that represents the distance between the subject's rating and a reference value for that item. The reference value was computed as the mean rating for the item. Individual differences were computed as the mean item distance between a participant's ratings and the reference values (i.e., the absolute value of the difference). Better performance is indicated by lower values, and a distance of zero indicates a perfect response. In the initial analyses, individual differences were calculated as the mean distance across the 14 items for each test. For these measures, reliability estimates of .80 and .64 were obtained for the Safe Speed and Accident Causation Knowledge tests.

To better understand the constructs measured by the two tests, we factored the 14 distance-items for each scale in two separate analyses. We then correlated the factor scores with the accident

criteria. The factor analysis procedure was based on recommendations in Jensen and Weng (1994). Each analysis:

(1) Used the SPSS principal axis factoring and the oblimin procedures to extract and rotate first-order factors.
(2) Used the principal components program to extract a single second-order factor, and
(3) Correlated the first and second-order factor scores with the accident criteria.

The most interesting results were obtained by analyzing the distance-items for the Safe Speed Knowledge test. Four eigenvalues were extracted that were greater than 1.0 and we obtained both two, three and four factor solutions. In each analysis, one of the first order factors was defined by the internal/emotional items and the remaining factors were defined by clusters of the environmental items.

Driving behaviors. We developed a self-report driving style measure on the basis of several previously-used measures on driving-related mild social deviance (West, Elander et al., 1993), driving violations (Lawton et al., 1997), offensive driving (Simon & Corbett, 1996), law breaking and impatience (Perry, 1986), and driving errors (Parker, Reason, Manstead, & Stradling, 1995). We modified items and developed additional items to strengthen the measures. After a sensitivity review by ARI staff, we made additional modifications to remove items that directly asked soldiers to implicate themselves regarding illegal driving behavior. Items asked individuals to respond on a seven-point Likert scale that indicated how often they engaged in a particular type of driving behavior. The anchors for the scale ranged from "never (0% of the time)" to "always (100% of the time)," with a mid-scale anchor of "often (41-60% of the time)."

Principal components and common factor analysis with varimax rotation were used to evaluate the factor structure of this measure, as well as that of a similar set of items asking soldiers to describe how often they think other drivers engage in the behaviors. The factors identified are shown in the top and bottom sections of Table B6. Nine items asked soldiers to indicate how often they speed or drive too fast (e.g., "When driving in a business or residential area, I find myself driving too fast."). Drive Too Fast had a coefficient alpha of .88. Seven items asked soldiers to indicate how often they make careless errors (e.g., "I forget to check my mirror and look out the back window before I back up."). This Forgetful Driver measure had a coefficient alpha of .80. Five items asked soldiers how often they drive because they enjoy the feeling of speeding or it gives them a sense of power. Drive to Feel Power/Speed had an alpha of .85. The Drink and Drive measure included such items as, "I would rather drive myself home after a few alcoholic drinks than take a taxi because of the difficulty of getting or possible dangers of using a taxi." This four-item measure had a coefficient alpha of .83.

Drive when Angry was a four-item measure with a coefficient alpha of .83 (e.g., "I chase or follow another car when angry at the driver."). Drive when Upset was a two-item measure with a coefficient alpha of .87 (e.g., "I go out driving when I am upset and need to let off steam."). Drive when Sleepy was a three-item measure with a coefficient alpha of .73 (e.g., "I have to continue driving when I feel sleepy."). Risky Driver included six items related to high-risk driving behaviors (e.g., "I pass a car when there is a sign that warns against it.") and had a coefficient alpha of .81. Drive Cautiously used two items to assess whether a person was a cautious driver (e.g., "I come to a

complete stop at stop signs.") and had a coefficient alpha of .55. Drive in Bad Weather included two items (e.g., "I would rather drive in bad weather at night than miss a good party or social event.") and had a coefficient alpha of .75.

The last scale in the top of Table B6, Confidence in Driving Ability, is a four-item measure to assess how confident a soldier feels about his/her driving ability. Items included, "I feel very confident about my ability to drive." A five-point Likert scale with anchors from "disagree very much" (1) to "agree very much" (5) was used. The coefficient alpha was .86.

In summary, 11 scales were used to measure driving behaviors and confidence in driving ability. Soldiers in this sample indicated that they Drive too Fast, when Upset, and in Bad Weather to not Miss a Social Event more frequently than they engage in the other behaviors measured. For these measures the mean was equal to or greater than 2.5, which is between the "rarely" and "sometimes" responses. The soldiers appear to be confident of their driving ability, with the mean on the Confidence in Driving Ability scale of 4.4 falling between the "agree somewhat" and "agree very much" scale points.

Driving history. We also asked respondents the number of warnings and moving violation tickets they have received since they began driving. These items were included on the Driving History form. Other items on this form asked whether they had ever had a suspended or revoked licensed. Table B6 shows that the average number of warnings was 2.56 and average number of moving violations tickets was 2.73. In addition, 16% reported that they had had a suspended license, and 3% reported they had had a license revoked. Drivers in accidents in this sample had about one more ticket on average than those in the total sample (3.85 versus 2.73).

Beliefs about Army discipline. We developed a seven-item instrument to measure attitudes Army discipline. The first three items in the "Scales on Beliefs about Army Discipline" section on Table B6 represent the responses to three individual items. These were, respectively, "If you commit an offense while in the Army, you can expect strong punishment," "If you commit an offense in the Army, they tend to forget about it fairly quickly," and "If you wrecked a military vehicle due to your own negligence and caused moderate damage to it, the most serious punishment you would expect is" (with responses from one, "no real punishment," through seven, "a court martial"). The third of these items had a seven-point scale. These three items did not load on factors with other Army discipline items as we had expected.

Punishment is Lax combined two items ("In the Army, individuals often get off with a minor reprimand when they should have received more serious punishment," and "You often see soldiers in the Army get rewarded or promoted even though they have been breaking the rules") and had a low coefficient alpha of .56. Punishment is Appropriate combined two items ("In the Army, when individuals disobey orders or rules, they are usually punished appropriately," and "In the Army, individuals often get off with a minor reprimand when they should have received more serious punishment") and had a coefficient alpha of .67.

Beliefs about severity of driving laws. We used seven items to measure Beliefs about Severity of Driving Laws. The first two in the table are single items ("Punishments for drinking and driving are too severe," and "The government should not interfere in people's personal lives

and require use of motorcycle helmets, seat belts, and air bags"), which did not load with the other five items on a single factor. The other five items are combined in the Total Scale on Driving Law Severity and have a coefficient alpha of .78. These included, "Speed limits posted at curves on roads are usually set too low," and "Police spend too much time stopping speeders and people making other driving errors." Soldiers tended to disagree that drinking and driving punishments are too severe. They showed less disagreement with the other items.

Driving anger. Items drawn from a measure by Deffenbacher, Oetting, and Lynch (1994) measured the amount of anger respondents felt in particular situations while driving. They rated each item with a five-point Likert scale with anchors from "not at all angry" (1) to "extremely angry" (5). Principal components and common factor analysis with varimax rotation supported the seven factors labeled in Table B6. All scales had acceptable internal consistency: Police Monitoring (.77, 4 items), Drivers' Rude Gestures (.85, 3 items), Drivers with High Beams (.82, 2 items), Slow Drivers Blocking Traffic (.86, 8 items), Large Trucks (.81, 5 items), Drivers Cut You Off (.81, 6 items), High Speed Drivers (.76, 4 items), and Total Driving Anger (.94, 33 items). Sample items from each scale include: Police Monitoring, "You see a police car watching from a hidden position"; Drivers' Rude Gestures, "Someone makes an obscene gesture towards you about your driving"; Drivers with High Beams, "A car coming toward you does not dim its headlights at night"; Slow Drivers Blocking Traffic, "Someone in front of you does not start up when the light turns green;" Large Trucks, "You are driving behind a large truck and cannot see around it"; Drivers Cut You Off, "Someone cuts right in front of you on the freeway"; High Speed Drivers, "Someone is driving too fast for road conditions." The soldiers in this sample expressed the greatest anger, on average, on Drivers with High Beams and Drivers Cut You Off. They expressed the least anger with Police Monitoring. The average response on the complete set of items was closest to the "moderately angry" scale point.

Others' driving behaviors. The statistics in the last section of Table B6 are for scales on which soldiers described how they think others typically drive. These were added based on ARI staff suggestions during the sensitivity review. The underlying idea is that, if one feels it is too sensitive to ask respondents to directly answer a question about their own behavior, one can ask them to describe how others behave and that will reflect their own behaviors. Bivariate correlations for the total sample (all individuals as cases) for the Driving Behaviors (Self) and Driving Behaviors (Others) did not support this. Although all of the ten bivariate correlations were positive and significant ($p<.05$), they only ranged in value from .12 to .31.

Scales for Driving Behaviors (Others) use the same items as the scales for Driving Behaviors (Self), with some rewording to reflect the fact that the respondent was to describe others rather than him/herself. The exception was that there was no equivalent to one self-descriptive item on the Drive when Upset scale on the items describing others. Driving Behaviors (Others) immediately followed the Driving Behaviors (Self). Coefficient alphas for the multi-item scales describing others were relatively high, with the exception of Drive Cautiously: Drive Too Fast (.94), Forgetful Driver (.93), Drive to Feel Power/Speed (.92), Drink and Drive (.95), Drive when Angry (.90), Drive when Sleepy (.88), Risky Driver (.91), Drive Cautiously (.67), Drive in Bad Weather Rather Than Miss a Social Event (.84).

Transient Variables

Table B7 shows all of the Transient Situational Factors and Table B8 shows all the Transient Personal Factors included in Study 2. Weekend Night Hour, Daylight, On Post, On Duty, and Environmental/Weather Problem were coded in the same way as in Study 1. In Study 1, all of these data had been obtained from USASC records. In Study 2, for any accident that was described in a USASC record, the data were taken from the USASC records. For any accident in self reports only, the data were based on items on the Accident Report form. This form included questions on whether the accident occurred on a weekday or weekend, at what hour of the day or night it occurred, whether it was daylight at the time, and if it was while the soldier was on duty or on post. Items asked what weather conditions were like and whether the condition contributed to the accident. Ten percent of the accidents in this sample occurred during weekend night hours, 77% occurred during daylight, 28% were on post, 47% took place while the soldier was on duty, and 42% occurred at a time when there was an adverse weather or environmental condition (i.e., poor visibility, rainy, foggy, snowy/icy, or windy).

We used a single item to ask if the respondent was wearing a seatbelt (scored 0 for no, 1 for yes). Based on either USASC data or the self-report, 81% of accidents involved a driver wearing a seatbelt. Items about other protective equipment were not on the self-report form, so only the seatbelt data from the USASC records was used, which is different from Study 1.

The respondent was also asked, "How familiar were you with the area in which you were driving?" and given three categories from which to choose: (1) "had not driven in the area before," (2) "somewhat familiar," and (3) "very familiar." This variable was not present in the USASC data. Of those who responded, 77.0% indicated they had not driven in the area before, 15.5% were somewhat familiar with the area, and 7.5% were very familiar with the area.

For Vehicle Condition, we asked, "Did a condition of your vehicle (e.g., blown tire, faulty brakes) contribute to this accident?" The USASC records also contained data on whether a vehicle's condition contributed to causing an accident. In the total sample of combined self-report and USASC accident records, 3.3% of cases involved a vehicle in need of repair.

Items asked respondents to indicate "How many passengers were in the vehicle with you?" and "Were the passengers distracting you or drawing your attention from the road?" The second item was coded 0 for no and 1 for yes. The average number of passengers was .62, and the maximum was 7. The majority (62.3%) reported they had no passengers, and 30.4% reported they had one or two passengers. In 3% of self-reported accidents, the driver responded that passengers were bothering him/her. Data for these variables were only available in self reports.

Data for four items on Driving Conditions and Driver Speed were available only in self reports. Amount of Traffic was coded 3 for "heavy traffic," 2 for "moderate traffic," 1 for "light traffic," and 0 for "no other traffic." Fifteen-and-a-half percent of accidents were in heavy traffic, 25.9% in moderate traffic, 36.3% in light traffic, and 22.3% in no other traffic. Speed of Traffic was coded 4 for "very high speed (above 70 mph)," 3 for "high speed (55-69 mph)," 2 for "moderate speed (30-54)," 1 for "low speed (below 30 mph)," and 0 for "no other traffic." Percentages of accidents in each of those categories were, respectively: 3.6%, 6.0%, 32.7%, 38.6%, and 19.1% Of those who responded to the question regarding Driver Speed versus Others, 53.8% of accidents were when the driver was driving "faster" than other traffic (coded 3), 2.4% were when the driver was

driving “about the same” (coded 2), 25.3%% were when the driver was driving “slower” (coded 1), and 18.5% were when their was “no other traffic” (coded 0). For Driver Speed versus the Limit, for 2.9% of accidents respondents indicated they were driving “clearly above the speed limit (11 or more mph above)” (coded 4). Six percent indicated they were driving “slightly above the speed limit (5-10 mph)” (coded 3), 42.0% said “at the speed limit (within 5 mph of the limit)” (coded 2), and 49.0% reported “below the speed limit” (coded 1).

Type of Roadway was based on USASC data when possible, and based on a self-report item otherwise. The self-report item included the five categories, as shown in Table B7; the USASC data was collapsed into the five categories, as described for Study 1. Eight percent of accidents in the Study 2 sample were on a major highway or interstate, 65% were on a city or suburban street or road, 11% on a country or rural road, 3% were in an off road area or unpaved area, and 9% were on a parking lot or in a building. Thus, in Study 2, the percentage of accidents on streets is the highest percentage, as in Study 1, but it is a considerably lower percentage than it was in Study 1 (i.e., 65% in Study 2 versus 85% in Study 1).

As for the Season of the Accident, based on available data, 14% took place in Spring, 24% took place in Summer, 10% in Autumn, and 13% in Winter. Although data on the month and quarter of an accident could be considered reliable for the USASC data, 39% of Self-Report Accident forms had the season of the accident left blank. Given that the vast majority of other items were completed by respondents, this suggests that individuals have a difficult time remembering some details of accidents after the passage of time.

The Self-Report Accident form used the Vehicle Type categories shown in Table B7. When Vehicle Type was taken from USASC records it was collapsed into these categories, as described for Study 1. Another item on the self-report form and in USASC data asked whether the vehicle being driven was a POV. The first ten categories are mutually exclusive; POV can be coded 1 for yes at the same time as another Vehicle Type is coded 1. The majority of accidents (68%) in Study 2 were in POVs The percentage was lower in Study 1 (44%) because that sample was restricted to those included in USASC records. In Study 2, a larger proportion of accidents took place while the driver was operating an automobile (54%) than in Study 1 (35%).

In Study 2, we were also able focus more on Transient Personal Factors that might influence accident criteria. Table B8 shows data from 12 items used to ask respondents if they were experiencing any major life events at the time of their accident. We asked them to check all that apply. These events are based on major life events considered to add considerable stress to individuals’ lives (Holmes, 1967). Counseling psychologists use similar lists to determine when patients may be at risk of stress-related illnesses or problems. Major changes, both positive (e.g., getting married, graduation) and negative (e.g., divorce, illness), are considered to be sources of stress. These data are available only for Self-Report Accidents. The “other” response was the most popular (17%). Respondents were not asked to write in what “other” referred to, so this category cannot be further clarified except to say that it should not include stressors in other items.

Emotional State before Accident was also included on the Self-Report Accident forms. Respondents were asked, “What was your emotional/mental state just before the accident occurred?” with categories “calm,” “somewhat stressed, anxious, or excited,” “very stressed,

anxious, or excited," "fatigued," and "cannot remember." Respondents said 78% of accidents occurred when they were calm, 12% when respondents they were somewhat stressed, 3% when respondents they were very stressed, and 7% when they were fatigued. Ten percent of respondents could not remember their emotional/mental state.

Other Physical/Mental Conditions assessed included the Average Hours of Sleep Per Night and whether the soldier had Sufficient Sleep before the Accident. The first of these was based on an item asking, "How much sleep do you normally get at night?" This item had the mutually exclusive categories "less than 5," "between 5 and 6," "between 6 and 7," "between 7 and 8," between 8 and 9," and "more than 9" hours, coded from 1 to 6, respectively. The mean on this item (2.56) is closest to the value for the "between 6 and 7 hours" category. The item on sufficient sleep asked, "Had you been getting sufficient sleep in the days preceding the accident?" and was coded 0 for no and 1 for yes. We did not define "sufficient sleep," but left it to the respondent to decide. Sleep experts recommend that the average adult should have eight hours of sleep per night to avoid problems due to fatigue (e.g., Maas, Axelrod, & Hogan, 1998), and, on average, soldiers reported getting between six and seven hours a night.

In the combined sample of Safety Center and Self-Report Accidents, 6% had either safety center or self-report data to indicate that alcohol or drug use had been involved. Of Self-Report Accidents only, 6% of these also had data to indicate alcohol had been used at the time of the accident. In self-reports, 4% of respondents indicated they had "any medication or drugs (including legal or illegal) in the hours immediately preceding the accident," 5% indicated that they were "affected by alcohol or medication when the accident occurred," and 4% indicated that "the effects of alcohol or medication taken by you was a contributing factor in this accident."

Rank at Time of Accident was recorded in self-report forms, as well as in USASC records. Marital Status at Time of Accident was measured only on self-report forms. At the time of 43% of the accidents in our sample, the driver was single, in 50% of accidents the driver was married, in 2% of accidents the driver was separated, and in 4% the driver was divorced.

Among the Other Transient Personal Characteristics, we measured Time Since Vehicle Training with a self-report item asking "When had you most recently received driver safety training prior to the accident?" Categories were coded 1 for "less than 6 months," 2 for "6 months-1 year," 3 for "1-2 years," and 4 for "more than 2 years." For Average Weekly Mileage, we asked, "On average, how many miles per week were you driving around the time of the accident?" The average was slightly above 326 miles per week. Years Driving at Time of Accident was based on the difference between a respondent's Age at Time of Accident and a question that asked, "How old were you when you first received a driver's license or learner's permit?" The average for Years Driving at Time of Accident was 8.9. The average Age at Time of Accident was slightly over 25 years.

Demographic/Control Variables

Table B9 shows descriptive statistics for the Demographic Characteristics, or control variables, included in Study 2. Limitations and Disabilities were taken from EMF data for the

soldiers in our sample. For most categories of limitation, less than 5% of the sample had a limitation. Eleven percent of the sample had an eyesight limitation.

Eleven percent of accidents in this sample involved a female driver, 69% a White driver, 19% a Black driver, and 11% a driver of Other Race. The average Current Age was about 27 years, and the average rank was about an E4. Current Years of Education was 12.5, and Current Years of Driving Experience was just over 11. Fourty-eight percent of accidents involved a driver with a Driving MOS (as described in Study 1); this was lower than the 62% for the accident sample in Study 1. This sample also had higher percentages for Armored (16% versus 4% in Study 1), Aviation (6% versus 1%), and Engineer (10% versus 4%) MOS, and considerably smaller percentages for Infantry (9% versus 22%) and Medical (3% versus 9%) MOS. The MOS categories in Study 2 had some additional categories that were not included in Study 1, due to differences in how MOS have been labeled and categorized over the years in Study 1 and 2. These were Electrical Maintenance and Mechanic MOS.

Results

Bivariate Correlational Analyses

Criteria

Table B10 shows intercorrelations among the eight criteria used in Study 2. Only the bivariate correlation between Total Accidents and Self-Report Accidents is high (.93). For the other variables, the intercorrelations suggest that the criteria are different enough for each to be analyzed. The high bivariate correlation between Total and Self-Report Accidents indicates that most of the accidents respondents had had been reported in self-reports. Only 24 accidents in USASC records were not reported in self reports. This suggests individuals can be fairly reliable sources of information on the number of accidents they have had in the recent past (i.e., last five years). In spite of the high bivariate correlation, we analyzed results separately for Safety Center and Self-Report Accidents, as well as for the combination of the two, Total Accidents.

Aptitude Measures

Bivariate correlations in Table B11 between ASVAB scores and the criteria indicate that most of the cognitive subtest scores are negatively related to Total Cost and/or number of Work Days Lost. These results support the Cognitive Aptitude hypothesis. However, most subtest scores are positively related to the number of Self-Report, Total, and Total At-Fault Accidents. These results are in the opposite of the hypothesized direction. Results shown in Table B12 for ASVAB Area Composite scores show the same pattern.

Results for Spatial Aptitude test scores, shown in Table B13, are much more similar to those for the spatial tests in Study 1, but there are some significant bivariate correlations in Study 2. The Map and Maze tests both have positive relationships with Self-Report and Total Accidents, which is contrary to the direction expected. Scores on the Orientation test had a marginally negative relationship with Severity and Total Cost. The Figural Reasoning test had a negative relationship with Severity, but a marginally positive relationship with Self-Report Accidents. The negative

relationships do provide some limited support for the Spatial Aptitude hypothesis, but the support is equivocal given the other significant positive relationships.

Table B14 shows that the Waypoint Risk Group score, which is the value from the test that is reported to organizations who wish to use it to predict accident involvement, is positively related to whether there was an Injury, the number of Work Days Lost, and the number of Safety Center Accidents. The Waypoint Risk Group score combines elements of perceptual accuracy and speed. Thus, these results appear to provide some support for the Perceptual and Psychomotor Aptitude accuracy and speed hypotheses.

Temperament

In bivariate correlational analyses (see Table B15), there was limited support for the scores from the Driver Judgment tests. The raw score on the Speed Judgment test was positively related to Total Cost and Total At-Fault Accidents. These relationships are in the direction expected.

Few temperament scales had significant results to support hypotheses. Results showed no support for the Type A or Agreeableness hypotheses. Results for the two Driving-Related Locus of Control, Thrill Seeking/Impulsivity scales provided no real support for those hypotheses. The single bivariate correlation related to a criterion in the direction hypothesized was for the Restless scale with Total At-Fault Accidents, however, the correlation was only marginally significant ($p<.10$). The other two significant correlations were negative, so they are opposite the direction hypothesized. The pattern of results for the aforementioned temperament scores looks as if it could be simply due to chance. There were no significant results for Work Orientation, so the Conscientiousness hypothesis was not supported. Only the Dependability scale from the AIM, used to test the Social Deviance hypothesis, provided results that supported a hypothesis. The Dependability scores were negatively related to Self-Report, Total, and Total-At-Fault Accidents, consistent with the Social Deviance hypothesis.

Driving Judgment, Behavior, History, and Attitudes

As shown in Table B16, the Driving Behaviors (Self) scales provided no support for the Risky Driving Behavior hypothesis: All risky driving behavior scales that were significantly related to the criteria were negatively related, which is opposite the direction hypothesized. In contrast, Driving History variables provided some mixed support for the Number of Tickets hypothesis. Although the Number of Tickets and Suspended License variables were correlated in the opposite direction with Severity and Injury as hypothesized, the Number of Warnings were positively correlated with Work Days Lost. And, the Number of Tickets shows consistency in having positive relationships with all four of the criteria representing the number of accidents.

Results for the Scales on Beliefs about Army Discipline and Driving Laws mostly supported the Negative Attitudes about Driving Safety hypothesis. Higher values on the item Expect Strong Punishment in the Army were negatively, though marginally, related to the number of Safety Center Accidents. Those who believe Offenses are Forgotten Quickly in the Army were more likely to have an injury or fatality in their accidents and higher costs. Those who agreed Punishment is Appropriate in the Army tended to have fewer accidents than those who disagreed. These results

are all in the direction hypothesized. The two marginally significant bivariate correlations for attitudes about driving law severity were both negative, which are in the opposite of the direction hypothesized (i.e., agreement that driving laws are too severe was marginally, negatively related to costs and at-fault accidents).

Results for Driving Anger scales did not support the expectation that angrier drivers would be more likely to be in accidents and that their accidents would be more serious. Of the few significant bivariate correlations, all were negatively related to the criteria, which is in the opposite of the direction expected. Scales describing others' driving behaviors also showed only a few marginally significant bivariate correlations in the direction opposite to that expected.

Transient Factors

Bivariate correlations of Transient Situational Factors and Accident Criteria can only be calculated for those who had accidents, because there is no situational data for those who did not have accidents. Results (see Table B17) indicate that several factors were significantly related to accident criteria. Weekend Night Hour was positively correlated with costs and lost work days. Accidents that took place in daylight had fewer Work Days Lost. Existence of an Environmental/Weather Problem was positively related to Severity, whether there was an Injury, and the number of Work Days Lost. A positive bivariate correlation indicates that those with more accidents in USASC files tended to have accidents while there was an environmental or weather problem. The negative correlation for Self-Report Accidents indicated that those who had more Self-Report accidents tended to have accidents that did not include such a problem. The directions of these results are mostly in the opposite direction of the results in Study 1, but consistent with the direction in the hypothesis. Self-Report Accidents were more likely to be off post and off duty, whereas Safety Center Accidents were more likely to be on duty. Accidents that occurred on duty were less likely to involve an Injury and involved fewer Work Days Lost.

Use of a Seatbelt was negatively related to Severity, Injury, Work Days Lost, and the number of Safety Center Accidents. This is consistent with national data relating seatbelt use to less severe accidents, and also suggests that those who wear seatbelts may be in fewer accidents than those who do not. Vehicles in need of repair tended to have less severe, but higher cost, accidents. Safety Center Accidents tended to be less likely to involve a vehicle in need of repair. Driver reports that passengers were bothering them were positively related to the Total Costs.

The Amount of Traffic was positively related to Severity. The Speed of Traffic was positively related to Severity, Injury, Total Costs, and Safety Center Accidents. Those who had more Self-Report, Total, and Total At-Fault Accidents were more likely to report they had been driving above the speed limit. These results are all as expected. In contrast, Self-Report, Total, and Total At-Fault Accidents tended to be in lower speed traffic, and respondents who had more At-Fault Accidents were more likely to report they were not driving faster than other traffic. These mixed results are somewhat ambiguous.

As for the influence of the Type of Roadway, the typical speed for the type of roadway was positively related to Severity and Injury. This is consistent with the findings for Speed of Traffic. Accidents on streets tended to be more severe and more likely to include an injury or fatality, and

accidents on parking lots or in buildings tended to be less severe and less likely to include an injury or fatality. Those with more Safety Center Accidents were less likely to have accidents on highways, and they were more likely to have accidents on streets.

Accidents in the Winter tended to be more severe and likely to include an injury or fatality. Soldiers with more At-Fault Accidents had fewer of accidents in Winter and more in Summer. Those with more Total and Self-Report Accidents tended to report more of them in the Winter, while those with more Safety Center Accidents were less likely to have them in Autumn.

Larger Vehicle Size was related to less likelihood of an injury or fatality in the vehicle. Motorcycles had more severe accidents with greater likelihood of injury or fatality; those with more Safety Center Accidents were more likely to report motorcycle accidents. In this sample, automobile accidents were related to lower Severity and fewer Work Days Lost. Soldiers with more Self-Report Accidents tended to drive automobiles in their accidents, while soldiers with more Safety Center Accidents were less likely to be driving an automobile during their accidents. Those driving small trucks tended to have less severe accidents, more lost work days, and be less likely to have more Safety Center Accidents. Jeeps/Humvees were positively associated with Safety Center Accidents, as were Large Trucks. Large Trucks were also associated with fewer Self-Reported Accidents and more severe accidents. Accidents in Other Army Vehicles were less likely to involve an injury or fatality in the vehicle. POV accidents were less severe, more likely to involve an injury or fatality, and involved more lost work days. Self-Report Accidents were more likely to be in POVs, and Safety Center Accidents were less likely to be in POVs.

Among Transient Personal Characteristics, the major life events of Divorce/Break-Up, Own Illness/Injury, and Other Major Life Events were positively correlated with one or more of the seriousness criteria (see Table B18). Graduation from School/College was negatively related to accident severity. The report of Other Major Life Events was positively related to Safety Center Accidents and At-Fault Accidents. Among categories on Emotional State before Accident, Fatigued was positively correlated with Severity. Those who reported they were Calm were more likely to have fewer At-Fault Accidents, fewer Self-Report and Total accidents, while those who reported they were Very Stressed were more likely to have more Self-Report, Total, and Total At-Fault Accidents.

Higher responses on Average Hours of Sleep per Night and Sufficient Sleep before the Accident were related to fewer accidents, as expected. Correlations for alcohol/drug use were also in the direction expected. Alcohol use was positively related to costs, and both alcohol and drug use variables were highly correlated with Self-Report, Total, and At-Fault Accidents. Alcohol or drug use in accidents was not correlated with the number of Safety Center Accidents.

There were a few scattered significant bivariate correlations for Rank at the Time of Accident, but no clear pattern of relationships with the criteria. Marital Status at the Time of Accident was related significantly to Self-Report, Safety Center, and Total Accidents. Soldiers who were single when they had accidents tended to have fewer Self-Report, Safety Center, and Total Accidents, while soldiers who were married at the time of accidents tended to have more Self-Report, Safety Center, and Total Accidents. Soldiers who were separated tended to have more Safety Center Accidents. These results are not consistent with results from Study 1.

More Time Since Vehicle Training was related to fewer Safety Center Accidents and less likelihood of injury. Higher Average Weekly Miles Driven was related to more Self-Report, Safety Center, Total, and At-Fault Accidents. Years of Driving Experience At the Time of Accidents was positively related to the number of Safety Center and Total Accidents; similarly, Age at the Time of Accidents was positively associated with Safety Center Accidents.

Demographic/Control Variables

Among limitations, having a Hearing Limitation was significantly related to accident severity, whether there was an injury or fatality involved, and cost of accidents (see Table B19). Eyesight Limitation was marginally related to less severe accidents. Soldiers with a Hearing or Eyesight Limitation reported fewer Self-Report Accidents and Total Accidents. Similar to results in Study 1, Black drivers tended to have more serious accidents, but fewer accidents, while White drivers tended to have more accidents. Current Age, Rank, and Years of Driving Experience were all positively related to the number of Safety Center Accidents. At first it might appear that this is an indication that older soldiers have had more time in which they could have potentially had an accident. However, these positive results are in spite of the fact that the number of Safety Center Accidents had been adjusted for the number of days since the soldiers had been licensed to drive if it was less than the five years covered in this study. So, these results are contrary to what one would expect for older, higher ranked drivers with more experience. Driving MOS showed no relationships to the accident criteria here, in contrast to what we found in Study 1. Among the individual MOS categories, there are no similar findings in Studies 1 and 2.

Preliminary Regressions

Aptitude Measures

Table B20 presents results for preliminary simultaneous regressions for the ASVAB Subtest, Composite, and AFQT scores. Regression results were considerably different from bivariate correlation results. Only one subtest, Arithmetic Reasoning, had a significant relationship with Work Days Lost when included in a regression with all the other subtests, whereas all subtests were negatively correlated with Work Days Lost. Arithmetic Reasoning scores were negatively related to the number of Work Days Lost, which is consistent with the Cognitive Aptitude hypothesis. The negative relationships of Mechanical Comprehension and Electronics Information with Severity and the negative relationship of Arithmetic Reasoning with Total Cost also supported the hypothesis; however, the positive relationship between Electronics Information with Total Costs was opposite the direction hypothesized. Paragraph Comprehension had a negative relationship with Total At-Fault Accidents, which is in the direction expected. Auto/Shop Information and Mathematics Knowledge had positive relationships with Total At-Fault Accidents, which are opposite the direction expected. For ASVAB Area Composites and the AFQT scores, for which results are also presented in Table B20, only the AFQT score was significantly related to one of the criteria, and this was not in the direction hypothesized. The two composite tests related to Self-Report Accidents were only marginally significant ($p<.10$).

As in Study 1, there was no support for the Spatial Aptitude hypothesis (see Table B21). The two spatial aptitude tests with marginally significant ($p<.10$) coefficients were both in the opposite direction as that hypothesized.

The one instrument used in Study 2 to test the Perceptual and Psychomotor Aptitude hypotheses, showed a greater relationship to accident seriousness than accident involvement (see Table B22). The Waypoint score was positively related to whether accidents involved an Injury and the number of Work Days Lost. It was also marginally related ($p<.10$) to Safety Center Accidents. The Channel Capacity Score and Channel Capacity Norm Groups were significantly related to all four seriousness criteria in opposite directions; neither of these representations of channel capacity was significantly related to the criteria if it was included with the Waypoint Risk Group, but without the other channel capacity score or group.

Temperament

Results for Type A Scale scores and Driving-Related Internal and External Locus of Control, shown in Table B23, were similar to those in bivariate correlations—none were significant. Thus, the Type A and Locus of Control hypotheses received no support. In contrast, the Agreeableness hypothesis did receive some support. Those with higher scores on Agreeableness tended to have fewer Work Days Lost, Safety Center Accidents, and Total At-Fault Accidents. The Social Deviance hypothesis also received some support: Higher scores on Dependability were related to lower Severity, less likelihood of Injury, and fewer Self-Report Accidents. In addition, those higher on Adjustment and Work Orientation were less likely to have had an Injury. Those high on Adaptability and Social Desirability had higher Severity and greater likelihood of an Injury. There was also a marginally significant ($p<.10$) negative relationship between Social Desirability and Self-Report Accidents. Thrill Seeking and Impulsivity had a few results supportive of their hypotheses. Those who rated themselves high on Restless, Lively, and Impulsive items had more Total At-Fault Accidents. However, the Impulsivity Total Scale had a negative relationship with Total At-Fault Accidents in the equation for which results are shown. When either the Impulsivity Total Scale or the Impulsive scale are removed from the equation, one of the remaining scales has a significant coefficient. Thus, the results shown in Table B23 may be an artifact of intercorrelations among the temperament variables included in the simultaneous analysis.

Driver Judgment, Behavior, History, and Attitudes

Table B24 shows results for regressions of the Driver Judgment scales. The raw score for the Speed Judgment scale was positively related to Total Cost and the number of Self-Report, Total, and Total At-Fault Accidents. The transformed score for the Speed Judgment scale was negatively related to Self-Report and Total Accidents. These results are consistent with what was expected by the scales' developers.

Results for respondents' ratings of their own Driving Behaviors are also shown in Table B24. For those coefficients that were significant, their directions were mixed. Drive to Feel Power/Speed was positively related to Work Days Lost, Drive when Sleepy was positively related to Safety Center Accidents, and the Average Hours of Sleep were negatively related to the Safety Center Accidents. These results are consistent with the Risky Driving Behavior and Sleep

Deprivation hypotheses. However, the results for Drive Cautiously and Drive in Bad Weather Rather than Miss a Social Event are in the opposite direction of that expected.

Results also provided mixed support for the Number of Tickets hypothesis. The Number of Tickets were negatively related to Severity and Injury, which is contrary to the hypothesis, while they were positively related to Self-Report, Safety Center, Total and Total At-Fault Accidents, which is consistent with the hypothesis. Suspended License was also negatively related to Severity and Injury, and Number of Warnings was negatively related to Total At-Fault Accidents, while Number of Warnings were positively related to Work Days Lost.

Driving Anger scales and scales on soldiers' Beliefs about Army Discipline and Driving Laws had no significant relationships with Severity, Injury, Total Cost, Work Days Lost, or Total Accidents. The Punishment is Appropriate scale was negatively related to Self-Report, Total, and Total At-Fault Accidents. This is consistent with the Negative Attitudes about Driving Safety hypothesis. However the marginally significant coefficients for Punishment is Lax with Self-Report and Total Accidents are in the opposite direction as that hypothesized.

Results for the scales measuring others' Driving Behaviors are shown at the bottom of Table B24. Ten coefficients out of 80 are significant, which is slightly higher than the eight one would expect by chance. But, the directions for these coefficients are mixed between positive and negative (6 of 10 are negative, and 4 are positive) such that it is difficult to see an interpretable pattern in the results.

Transient Factors

Table B25 presents results for regression analyses of Transient Situational Factors. These equations are based only on those who had accidents because those without accidents do not have data for the situational variables. Weekend Night Hour is positively related to Injury, which is consistent with the hypothesis. The existence of an Environmental/Weather Problem is related to fewer Self-Reported and Total At-Fault Accidents, but positively related to the Safety Center Accidents. These results provide mixed evidence regarding whether individuals who have accidents tend to be more likely to have them during periods of inclement weather.

For other Transient Situational Factors, being On Post is negatively related to Self-Report Accidents. Being On Duty is negatively related to Injury, but positively related to Safety Center accidents. Use of a Seatbelt is negatively related to Severity, Injury, Work Days Lost, and Self-Report and Safety Center Accidents. Familiarity with the Road is positively related to Severity, but negatively related to Self-Report Accidents. Contrary to expectation, a problematic Road Condition is negatively related to Safety Center Accidents, but in accordance with expectations, the Amount of Traffic is positively related to Safety Center Accidents, and the Speed of Traffic is positively related to Severity, Injury, Total Cost, and Safety Center Accidents. In addition, driver speed higher than the speed limit is positively related to Total and Total At-Fault Accidents. The negative relationship of driver speed higher than other traffic with Total At-Fault Accidents is not in the direction expected.

Those who reported having a vehicle in need of repair at the time of an accident had less severe accidents, but self reported more accidents. Those in larger vehicles had more Self-Report Total At-Fault Accidents in the regression equation. Having an accident on a highway, parking lot or in a building was negatively related to the number of Safety Center Accidents a soldier had, and having an accident on a parking lot or in a building was negatively related to the likelihood of Injury. Motorcycles were related to higher Severity and likelihood of Injury. Driving a Small Truck was related to fewer Safety Center Accidents, and driving a large Truck was related to higher Severity.

Results for Transient Personal Characteristics are in Table B26. Among the twelve major life events listed at the beginning of the table, Divorce/Break-Up, Own Illness/Injury, Problems with Parents, and Other Major Life Events each had at least one positive relationship with one of the criteria. This supports the Stress hypothesis. Contrary to expectations, Problems at Work/School had at least one negative coefficient. The same regression equations also indicated that those undergoing Some Stress at the time of accidents reported more Self-Report and Total At-Fault Accidents, which also supports the Stress hypothesis. Those who reported being Fatigued had higher Severity, likelihood of Injury, and more Self-Reported and Total Accidents, which supports the Sleep Deprivation hypothesis.

Being Affected by Alcohol/Drug use was positively related to Total Costs. (Other alcohol/drug-use variables were not included in models on seriousness criteria because they were highly intercorrelated and created multicollinearity; all the alcohol- and drug-related variables could be included in the equations with criteria on number of accidents because the intercorrelations were not as high with the sample used for those equations.) Use of Alcohol and the Use of Medicine/Drug were positively related to Total Accidents. These results support the Alcohol/Drug Use hypothesis.

In addition to these variables, several control variables also showed relationships with one or more criteria. Those who were at the E1 or E2 level at the time of an accident had significantly higher severity, more likelihood of injury, and more work days lost than the reference group, those at the E4 level. Other ranks were not significantly different from E4s on the seriousness criteria, with one exception—those at the E3 level were significantly more likely to have had an Injury in their accident. In contrast, those at the level E1, E2, E3, and E5 had fewer Self-Reported Accidents than those at the E4 level and the other ranks. Those at tE3s, E5s, and E6s had more Safety Center Accidents relative to those at the E1, E2, E4, E7s, and E8s. The interpretation of this pattern is not clear. Relative to Single soldiers, those who were Married had lower Total Cost, more Work Days Lost, and more Self-Reported, Safety Center, and Total Accidents in these equations. Those who were Separated or Divorced also had more Safety Center Accident reports. These results are not consistent with Study 1 results.

More Time Since Vehicle Training was related to fewer Safety Center Accidents and less likelihood of injury. Average Weekly Mileage Driven was positively related to the number of Self-Report, Total, At-Fault Accidents, and Total Cost. One would expect more accidents for those with greater time driving. Years Driving Experience at Time of Accidents was negatively related to Total Cost and positively related to Self-Report and Total At-Fault Accidents. Age at Time of

Accident had a positive relationship with Total Cost, but negative relationships with Self-Report and Total At-Fault Accidents.

Demographic/Control Variables

As shown in Table B27, those with a Hearing Limitation tended to have accidents with higher Severity and Total Cost, whereas those with an Eyesight Limitation had lower Severity. Relative To Whites, Blacks had greater likelihood of Injury, but fewer Self-Report, Total, and Total At-Fault Accidents. Higher Current Age was related to higher Severity and Total Cost, but fewer Self-Report Accidents. Current Rank, coded as a continuous variable, was positively related to the number of Safety Center and Total Accidents. Current Years of Education had a positive relationship to Total Cost and a negative relationship to Total At-Fault Accidents. Current Years of Driving Experience had a negative relationship to Total Cost, but a positive relationship with the number of Self-Report Accidents. Driving MOS had a positive relationship with the Injury variable. The number of significant coefficients (10 of 112 possible) for the various MOS is less than what one would expect by chance, shows no clear pattern, and has no consistency with results from Study 1.

Preliminary Event History Analyses

Another method for analyzing relationships between the independent variables and number of accidents individuals had is to use event history analysis. Some individuals in Study 2 had more than one accident. When individuals have more than one accident (i.e., repeated events) each of their accident cases is nonindependent. Two or more cases coming from the same individual tend to be more alike than two randomly chosen observations. Treating such cases as independent can lead to standard error estimates that are biased downward and test statistics that are biased upwards. (Allison, 1995). Wei, Lin, and Weissfeld (1989) proposed a method for getting variance estimates that allow for dependence among multiple events. Allison (1995) has presented a macro for implementing the method, which we used. We have included data from up to the first three accidents any soldier in this sample had in our records. This repeated events history analysis produces a coefficient estimate that represents the relationship between an independent variable and a criterion (i.e., accident involvement) for all of the data for the first accidents, second accidents, and third accidents. That is, three coefficients are produced. Statistical tests are provided with this method to determine whether all three coefficients are equal to one another, all three are equal to zero, and a pooled coefficient estimate is significantly different from zero. We will use event history analysis results as additional evidence on relationships between the independent and criterion variables in this study.

Pooled coefficient estimates and their standard errors are presented in Tables B28 through B33. Those that are marked significant are significant on all three tests and have a pooled coefficient which is significantly different from zero. No overall significance tests or statistics are provided for sets of variables included simultaneously in an analysis, although individual coefficients are affected by the inclusion of the other variables. Some individual variables analyzed together in regression analyses could not be analyzed simultaneously in an event history analysis because the procedure would not result in a solution.

Aptitude Measures

Among results for the ASVAB Subtest Scores, shown in Table B28, Coding Speed has a small negative relationship and Mechanical Comprehension has a small positive relationship with the number of accidents. This is consistent with the negative coefficient for Coding Speed in the regression analysis of Self-Report Accidents and with the positive coefficient for Mechanical Comprehension in the regression analysis of Total Accidents (see Table B20). Other significant relationships in the regression analyses were not confirmed in the event history analysis. None of the ASVAB Composite Scores (Table B28) or Spatial Aptitude Test Scores (Table B29) had significant coefficients in the event history models. The Waypoint Score and Channel Capacity Scores also did not have significant coefficients in the event history models.

Temperament

None of the temperament variables that could be included in event history analyses had significant pooled coefficients. As shown in Table B31, these included Driving-Related Locus of Control, Type A, AIM, Driving Anger, and Impulsivity Scales.

Driver Judgment, Behavior, History, and Attitude

Of the Driver Judgment, Behavior, History, and Attitude measures included, as shown in Table B32, few had significant coefficients. Contrary to expectations, although consistent with bivariate correlation results, the Drink and Drive measure from the self-reported Driving Behaviors scales was negatively related to the number of accidents. The three items on this measure asked respondents to indicate what percentage of the time they would rather drive themselves home after having a few alcoholic drinks. These results are not consistent with national statistics or with findings for other variables in this study related to drinking and driving.

The Number of Tickets respondents had received for moving violations since they received their driver's license was positively related to the number of accidents. This is consistent with both bivariate correlation and preliminary regression results. In addition, those who believe other U.S. drivers tend to drive cautiously tended to have fewer accidents according to the event history analysis result for the Drive Cautiously measure from the Driving Behaviors scales describing others' driving behaviors. This is also consistent with both bivariate correlation and preliminary regression results.

Demographic/Control Variables

Several Demographic and Control Variables could not be included in event history analyses because the proportion in the sample who had a positive value on the variables was quite small (e.g., proportion with a physical limitation). Results in Table B33 indicate that individuals with Eyesight Limitations were less likely to be in accidents, which is consistent with preliminary regression results. Those in Armored, Chemical, Electrical Maintenance, Medical, and Military Police/Intelligence MOS were also less likely to be in accidents, according to the event history analyses. These results are not very similar to those in the regression analyses.

Transient Personal and Situational variables could not be included in the event history analyses because these analyses use the individual, rather than accidents, as cases. There are no transient variable data for individuals who had no accident records, and for those with multiple records there are different values for the same transient variables for the same individuals.

Final Regressions

In the first analysis for each final, or "best," regression model, only personal characteristics that could be considered useful for selection purposes were included. In the second analysis, transient situational variables are added to the model. These first and second analyses cannot be strictly considered two steps in a hierarchical regression analysis as they were in Study 1. In the "Selection Variables Only" analyses, the regression is calculated with the maximum possible sample for the variables included. Because sample size was considerably reduced for some transient situational variables, we ran a new regression analysis including both the selection and transient variables.

Severity

Table B34 shows that selection variables accounted for 10% of the variance in Accident Severity, while transient variables accounted for an additional 6% of variance. Significant variables include having a Suspended License, which is negatively related to Severity, and the Electronics Information test, which is positively related. These results are contrary to expectations. Those with a rank of E1, E2, E3, E5, and E6 at the time of an accident had more severe accidents relative to other ranks, but with the inclusion of transient variables only those with ranks of E3 or E6 had more severe accidents than other ranks. Accident Severity is also positively related to having a Hearing Limitation, going through a Divorce/Breakup, and driving in higher speed traffic. Soldiers who were Using a Seatbelt had less severe accidents. These results are generally consistent with what one would expect.

Injury

As shown in Table B35, the best logistic regression model for variables related to whether there was an Injury in an accident indicated that soldiers who were higher on the Work Orientation Scale and who agreed that Police Monitoring made them angry were less likely to have accidents involving an Injury. Those who Believe Offenses are Forgotten Quickly in the Army, got Angry at High Speed Drivers, and had a higher Waypoint Test Risk Score were more likely to have had an accident involving an injury. After transient variables were added, the Believe Offenses Forgotten Quickly in the Army scale was no longer significantly related to Injury. Use of a Seatbelt and Time since Training on this Vehicle were negatively related to Injury. Speed of Traffic, Getting Married/Engaged, and Other Stressful Events all had positive relationships to Injury. With the exception of the result for anger regarding Police Monitoring, these results are generally consistent with expectations. Although the fact that longer Time since Training on this Vehicle was negatively related to Injury might seem odd, it may be that the longer time indicates longer experience operating the vehicle in question.

Total Cost of Accidents

As Table B36 shows, the Arithmetic Reasoning score was negatively related to Total Costs when it was included in a model with only other selection variables. Once transient variables were included, it was no longer significant. Those with a Hearing Limitation or who Believe that Offenses are Forgotten Quickly in the Army had higher cost accidents according to both models. Other transient factors that were related to higher cost accidents were having a vehicle in need of repair, information in the USASC accident record indicating alcohol involved in the accident, going through an illness or injury, driving in higher speed traffic, and having passengers bothering the driver. All of these results are consistent with expectations.

Work Days Lost

Results for Work Days Lost are in Table B37. The Arithmetic Reasoning score was negatively related, as it had been with Total Cost. This is consistent with the Cognitive Aptitude hypothesis. The Mechanical Comprehension score was positively related to Work Days Lost in the model including only selection variables, which is not consistent with the hypothesis. However, it was no longer significant with transient situational variables included. Relative to others, soldiers with a rank of E1 or E2 had more Work Days Lost in their accidents. Those with a higher Waypoint Risk Score, driving a Small Truck, driving late on a Weekend Night, and going through a Divorce/Breakup had more Work Days Lost in the accidents. Those Using a Seatbelt had fewer Work Days Lost. These results are generally consistent with hypotheses and expectations. The first equation accounted for 15% of the variance in Work Days Lost; with the addition of the transient variables, the second equation accounted for 28% of the variance.

Number of Accidents Per Day

Results for equations predicting the number of accidents soldiers had per the number of days during which they could have had an accident in our database are shown in Tables B38 through B41. These equations were able to account for 5% of the variance in Self-Report, 9% of in Safety Center, 5% in Total, and 12% in Total At-Fault Accidents Per Day. Of the results for individual variables, those for the Number of Tickets, Waypoint Score, Average Hours of Sleep, Belief that Army Punishment is Appropriate, and Raw Score for the Speed Judgment test are consistent with hypotheses and expectations. The Number of Tickets soldiers had received for moving violations had a positive coefficient in all four regression analyses. Those who Believe that Army Punishment is Appropriate tended to have fewer Total and Total At-Fault Accidents.

Summary of Study 2 Results and Comparison to Study 1 Results

Basic results for hypotheses for both Studies 1 and 2 are summarized in Table 1 on pages 15-19. The Cognitive Aptitude hypothesis received support in correlation results for inverse relationships between cognitive aptitude and the criteria in Study 1, but there were also positive correlations with severity criteria. In addition, the negative correlations that were found in Study 1 were very weak, in spite of the fact they were significant (due to the statistical power from the large sample size for the Had an Accident criterion). In Study 2, results for bivariate correlations

between cognitive aptitude and criterion measures were quite mixed. Many of the ASVAB Subtest and Composite Scores were negatively related to Total Cost and Work Days Lost. However, many of the ASVAB Subtest and Composite Scores were positively related to the number of Self-Report, Total, and Total At-Fault Accidents. In the preliminary regression analyses in Study 2, there were 13 significant ($p<.10$) coefficients out of 88 possible (15%) for ASVAB Subtests, and 6 of these were positive and not in the direction hypothesized. There were only 3 significant ($p<.10$) coefficients out of 88 possible for the ASVAB Composites, and two of these were not in the direction hypothesized. Preliminary regression, event history, and final regression analyses did not indicate that any of the ASVAB Subtest or Composites could be considered with any confidence to be a useful predictor of accident involvement or seriousness. Results in Study 1 provided no real support for the Cognitive Aptitude hypothesis; several relationships were significant in Study 1, but they were quite small.

Studies 1 and 2 did not provide much support for the Spatial Aptitude hypothesis, either. There was no support for relationships between spatial aptitude tests and criteria in Study 1. In Study 2, the Orientation Test had negative bivariate correlations with Severity and Total Cost, and the Figural Reasoning Test had a negative correlation with Severity. But, the Maze and Object Rotation Tests had positive correlations with Self-Report and Total Accidents, and the Figural Reasoning Test had a positive correlation with Self-Report Accidents. Preliminary regression, event history, and final regression analyses also did not support the Spatial Aptitude hypothesis in Study 2.

The Waypoint Test did provide some support for the Perceptual and Psychomotor Aptitude hypotheses in Study 2. The Waypoint score was positively correlated with Injury, Work Days Lost, and Safety Center Accidents. It was also positively related to these three criteria in preliminary regression analyses. Although it did not have a significant pooled coefficient in the event history analysis, it did have a significant positive relationship with Injury, Work Days Lost, and Safety Center Accidents in final regression models. Final regression analyses in Study 1 also provided support for these hypotheses. Soldiers with higher Perceptual Speed Composite scores (faster speed) had lower cost accidents. Those with longer Perceptual Speed Median Movement Times (slower speed) had greater likelihood of fatalities and more severe accidents. Those with a higher percentage of correct items on Choice Reaction or Perceptual Speed tests had fewer injuries and fatalities, less severe accidents, and less likelihood of having had an accident.

Neither Study 1 nor Study 2 provided support for the Type A hypothesis. It may be that the self-report measures used to assess these constructs are not valid representations of these constructs. Study 1 also provided no support for the Agreeableness, Social Deviance, Driving-Related Internal Locus of Control, or Driving-Related External Locus of Control hypotheses. In Study 2, the AIM Dependability scale, used to test the Social Deviance hypothesis, was negatively correlated with Self-Report, Total, and Total At-Fault Accidents. It had negative coefficients with Severity, Injury, and Self-Report Accidents in preliminary regressions. Study 2 results did not provide support for the hypotheses on Internal and External Locus of Control, consistent with Study 1. Contrary to Study 1 results, Study 2 did provide some support for the Agreeableness hypothesis: Agreeableness was negatively related to Work Days Lost, Safety Center Accidents, and Total At-Fault Accidents in preliminary regressions. But this measure did not have significant relationships with criteria in final regression analyses.

Study 2 provided little support for the Thrill Seeking and Impulsivity hypotheses. Impulsivity scale scores, including Restless, Risk Taker, Lively, and Impulsive were not correlated with the accident seriousness criteria. Restless had a marginal positive relationship ($p<.10$) with Total At-Fault Accidents, but Risk Taker and the Impulsivity Total Scale had negative relationships with Safety Center Accidents, which are in the opposite direction of that hypothesized. Preliminary regression results indicated that Restless, Lively, and Impulsive scales all had marginal positive relationships with Total At-Fault Accidents, while the Impulsivity Total Scale had a marginal negative relationship. This pattern may be due to a suppressor effect. No results were significant in final regressions for these variables. In Study 1, the Impulsivity hypothesis was not tested, but results for the Rugged Individualism score and Rugged/Outdoors composite score consistently supported the Thrill Seeking hypothesis.

The Work Orientation scale in Study 2 did not provide support for the Conscientiousness hypothesis, and in Study 1 it had some positive correlations and regression coefficients with criteria, which were in the opposite of the direction hypothesized. In Study 1, the ABLE Conscientiousness scale also did not provide support for the hypothesis. However, the performance rating on Following Regulations and Orders and the rating composite, Personal Discipline, both showed strong negative relationships with accident criteria in Study 1.

The Risky Driving Behavior hypothesis was not supported in Study 1: Driver errors were not related to the accident criteria. Very few self-described risky Driving Behaviors in Study 2 were related to criteria, and many of these were in the opposite of the direction hypothesized. The lack of consistent results for these measures provides no confidence that they could be useful as predictors of soldiers' accident involvement.

In contrast, the Number of Tickets hypothesis in Study 2 had mostly strong and consistent support. The results suggest the Number of Tickets received for moving violations can be a useful predictor of soldiers' accident involvement and seriousness. The Number of Tickets was correlated positively with the number of Self-Report, Safety Center, Total, and Total At-Fault Accidents. It also had positive coefficients with all four of these criteria in both preliminary and final regressions and a positive coefficient with number of accidents in the event history analyses. In Study 1, data on reasons for enlistment waivers were analyzed. These data showed positive relationships for misdemeanor and felony waivers with accident criteria in both bivariate correlation and preliminary regression analyses. However, the small numbers of individuals with some of the waiver classifications weaken the interpretability of this data.

The hypothesis on Negative Attitudes about Driving Safety was not tested in Study 1, but results for measures developed for Study 2 provided some support for this hypothesis. High raw scores on the Speed Judgment test, which indicated that an individual's judgments deviated significantly from the average, were positively correlated with Total Cost and Total At-Fault Accidents and also positively related to these criteria in preliminary regressions. In addition, both the raw score and transformed score for the Speed Judgment test had relationships in the expected directions with Self-Report and Total Accidents in preliminary regressions. In final regression analyses, the raw score for the Speed Judgment test had a positive relationship with Total At-Fault Accidents Per Day.

Soldiers who agreed that Offenses are Forgotten Quickly in the Army had more accidents involving an Injury and higher cost accidents in Study 2 bivariate correlations. The Expect Strong Punishment item indicated that those who believe punishment in the Army is severe or strong had fewer Safety Center Accidents according to bivariate correlations. The correlations between agreement that Punishment is Appropriate in the Army and Self-Report, Total, and Total At-Fault Accidents were negative. In preliminary regressions, the Punishment is Lax scale was negatively related to Self-Report and Total Accidents, which is opposite the hypothesized direction. However, these coefficients were only marginally significant ($p<.10$). Punishment is Appropriate was negatively related to Self-Report, Total, and Total At-Fault Accidents ($p<.05$). In final regressions, agreement with Believe Offenses Forgotten Quickly in the Army was positively related to Injury and Total Cost. Agreement with Punishment is Appropriate was negatively related to Total and Total At-Fault Accidents. Given that these measures on Army Discipline were administered after the soldiers' accident histories occurred, we cannot say that beliefs about Army Discipline necessarily influence soldiers' driving behaviors and accident involvement. It may be that the causal order is in the opposite direction: Soldiers who have had accidents and been disciplined have more negative views of Army discipline afterwards than soldiers who have not had accidents or have had fewer accidents.

When an Environmental/Weather Problem was present at the time of accidents, accidents were more severe, more likely to involve an injury, and involved more Work Days Lost based on bivariate correlations from Study 2. Environmental/Weather Problem was also positively correlated with Safety Center Accidents, but negatively correlated with Self-Report Accidents. In preliminary regressions Environmental/Weather Problem was negatively related to tSelf-Report and Total At-Fault Accidents, but positively related to Safety Center Accidents. Environmental/Weather Problem was not a significant factor in any of the final regression models. In Study 1, relationships between Environmental/Weather Problem and accident criteria were all negative indicating that when a problem existed an accident was less serious or likely to occur. This is contrary to the direction in the hypothesis and to the positive findings for Safety Center Accidents in Study 2.

Results from both Studies 1 and 2 were more supportive of the Late Night Weekend Driving hypothesis. All types of analyses in Study 1 supported the hypothesis. In Study 2, Weekend Night Hour was positively correlated with Total Cost and Work Days Lost, and positively related to Injury and Work Days Lost in preliminary regression analyses. It was also positively related to Work Days Lost in final regression analyses. Thus, both studies provided consistent support for a positive relationship between late night weekend driving and accident involvement and severity.

Neither the Stress nor Sleep Deprivation hypothesis could be tested in Study 1. In Study 2, a few of the stressful life events were positively related with accident criteria in bivariate correlations or preliminary regressions: Divorce/Break Up, Own Illness/Injury, and Other Major Life Events. Being Fatigued at the time of an accident was positively related with Severity in both bivariate correlations and preliminary regression analyses. Being Very Stressed was positively correlated with Self-Report, Total, and Total At-Fault Accidents, and being Somewhat Stressed was positively related to Self-Report and Total At-Fault Accidents in preliminary regressions. Higher Average Hours of Sleep were negatively correlated with Safety Center Accidents and also negatively related to Safety Center Accidents in the final regression analyses. Having Sufficient Sleep before an

Accident was negatively correlated with Self-Report and Total At-Fault Accidents, but positively related to accident Severity in preliminary regressions. So, Study 2 results provided some limited support for the Stress and Sleep Deprivation hypotheses.

Evidence supported the Alcohol/Drug Use hypothesis in both Studies 1 and 2. In Study 2, Self-Reported Alcohol Use and the Self-Report on being Affected by Alcohol/Drugs were positively correlated with Total Cost. All items measuring Alcohol/Drug use and influence were positively correlated with Self-Report, Total, and Total At-Fault Accidents. Preliminary regressions provided very similar support for the relationship between alcohol or drug use and accident criteria, though no significant relationships were found in final regression analyses.

Several Transient Situational, Transient Personal, Demographic, and Control variables were also included in Studies 1 and 2 for which there were no formal hypotheses. Several of these show some consistent relationships with criteria. For example, results in both Studies 1 and 2 suggest that soldiers have less severe accidents, more Safety Center Accidents, and fewer Self-Report Accidents while on duty and on post. Using a seatbelt has consistent negative relationships with both severity criteria and the number of accidents. Perhaps those who are cautious enough to wear a seatbelt are also more cautious drivers and, therefore, get involved in fewer accidents. Roadway Speed (i.e., type of roadway) was positively related to accident seriousness criteria in both Studies 1 and 2. An item measuring the Speed of Traffic was also related to seriousness criteria in Study 2. In addition, drivers who indicated they drove over the speed limit also had more Self-Report, Total, and Total At-Fault Accidents. Among Demographic and Control Variables, having a Hearing Limitation tended to be positively associated with having more severe accidents, higher cost accidents, and a greater likelihood of an injury in an accident in Study 2. However, it did not show significant relationships with criteria in Study 1.

DISCUSSION

Overview of this Research

In summary, TRADOC tasked ARI to conduct a study to identify characteristics of soldiers who are most likely to be involved in accidents while operating military vehicles. The objective of this research was to identify characteristics that Army commanders can use to select safer drivers from among soldiers in their units. Because the majority of accidental deaths in the Army are in POV accidents, we included factors that leaders could use to inform soldiers to reduce their risks of being involved in either on- or off-duty accidents. These include transient factors which may be personal characteristics that change over time or situational factors that differ from one situation to another.

This project involved: (1) a review of the research literature on factors related to accident involvement; (2) statistical analysis of soldier characteristics and accident data already available to the Army; (3) testing of measures specifically developed or chosen for predicting accident involvement among soldiers; and (4) development of practical guidelines that Army leaders can use to select drivers. The review of the research literature yielded a summary of findings from previous studies and hypotheses based on that body of literature. In addition, national and USASC statistics were used to estimate the number of fatalities per 100,000 soldiers and 100,000 U.S. residents.

After controlling for differences in gender and age between the U.S. resident population and Army enlisted ranks, we estimated that there were 25 fatalities per 100,000 Army soldiers in FY96 and 29 fatalities per 100,000 U.S. residents with a similar gender-age breakdown. Thus, this estimate suggests that the Army fatality rate from military accident rates was not higher than that for the U.S. resident population.

The research project focused on conducting two empirical studies. Study 1 used existing Project A, EMF, and USASC databases to analyze relationships of aptitude, temperament, driving style, transient, demographic, and control variables with soldiers' involvement in accidents. The existing databases provided information for more than 60,500 soldiers who entered the Army in 1986-87. We used USASC accident records for the years 1986-98 for the soldiers in this sample. Study 1 used five criteria: involvement in an accident, total cost, severity, number of injuries, and number of fatalities. Study 2 used 1998 EMF data and 1983-98 USASC accident records combined with responses from a new data collection that had 551 enlisted Army personnel as subjects. The new data were collected with paper-and-pencil self-report instruments in classroom-type, group settings. This second study included the same major categories of independent variables (i.e., aptitude, temperament, driving style, transient, demographic, and control variables) as Study 1. Study 2 used eight dependent variables: total cost, involvement of injury in accident, number of work days lost, severity, number of total accidents, number of at-fault accidents, number of Self-Report Accidents, and number of Safety Center accidents.

Of the 19 hypotheses, 5 could not be tested in Study 1 (9, 11, 12, 13, 16, 17). Of the 14 hypotheses that could be tested in Study 1, 4 were clearly supported (3a, 8, 15, and 18), 4 received mixed support (significant results in both the hypothesized and opposite directions—1, 2, 6; or good support for some measures, but no support from other measures of the construct—10), and 6 were not supported (2, 4, 5. 7a, 7b, 14). Of the 19 hypotheses that could be tested in Study 2 (all 19 hypotheses, except 3a and 3b could not be differentiated in Study 2, as they had been in Study 1), 11 were supported (3a, 3b, 5, 6, 9, 12, 13, 15, 16, 17, 18), 4 received mixed support (1, 2, 10, 14), and 5 were not supported (4, 7a, 7b, 8). However it is important to appreciate that many hypotheses were tested multiple times and some of the significant results may reflect type 1 errors.

Six hypotheses (9, 11, 12, 13, 16, and 17) could only be tested in one of the two studies because data were not available in both studies. Of the 13 hypotheses that were tested in both Studies 1 and 2, 3 had support in both Studies (3a, 15, and 18). These hypotheses were on the subjects of Perceptual and Psychomotor Aptitude correct responses, Late Night Weekend Hour, and Use of Alcohol and/or Drugs. Three hypotheses (4, 7a, 7b), on Type A Subscales and Driving-Related Internal and External Locus of Control received no support in either study.

Four hypotheses (2, 5, 8, and 14) received different types of support in the two studies. For Hypothesis 2, on Spatial Aptitude, Study 1 results showed no support in Study 1; Study 2 results showed a few mixed bivariate correlations. Thus, these results really support the same conclusion: Spatial Aptitude tests used in this research do not appear to be useful predictors of accident criteria among soldiers.

Hypothesis 5, on Agreeableness, had no support in Study 1, but some support in preliminary regressions in Study 2. Of the three significant regression coefficients in Study 2, two were only of

marginal significance ($p<.10$). This very limited support does not suggest that the Agreeableness scales from either the AIM (Study 2) or ABLE (Study 1) are useful predictors of accident criteria. Differences in the results might be due to the use of the different temperament measures in the two studies.

Hypothesis 8, on Thrill Seeking, received some indirect support from the significant relationships for the Rugged Individualism scale and Rugged/Outdoors composite in Study 1. A different measure of Thrill Seeking, the Risk Taker scale developed just for this research, was used in Study 2. The Risk Taker measure was a short measure (4 items) with a coefficient alpha internal consistency reliability of .85. Differences in results may be due to the content of the two measures or some degree of attenuation of relationships between the scale and criteria in Study 2.

Finally, Hypothesis 14, on Inclement Weather, received no support in Study 1 and mixed support in Study 2. In Study 1, results were in the opposite direction of the hypothesis: Inclement Weather was negatively related to the criteria. Results in Study 1 were very consistent across analyses: The existence of an Environmental/Weather Problem was negatively related to Injuries, Fatalities, and accident Severity in bivariate correlations, preliminary regressions, and final regressions. Results were less consistent in Study 2: the existence of an Environmental/Weather Problem was positively correlated with Severity, Injury, and Work Days Lost, but not related to them in regressions. It was also negatively related to the number of Self-Report Accidents an individual had in both bivariate correlation and regression analyses, negatively related to Total At-Fault Accidents in the preliminary regression analysis, and positively related to Safety Center Accidents in both bivariate correlation and regression analyses. The accident seriousness variables in Study 1 were all from USASC records, whereas more accidents in Study 2 were based on Self-Report records. The difference in results could be due to the difference in sources of data.

In all, 29% of the hypotheses tested in Study 1 received support and 56% of the hypotheses tested in Study 2 (if one only counts 3a and 3b as a single hypothesis, 10 were supported out of 18) received consistent support. The fact that fewer than half of the hypotheses received support in Study 1 may be due to limitations of that study.

Strengths and Limitations of This Research

Unfortunately any single research study has design weaknesses or limitations—no single study can ever eliminate all possible threats to the validity of the research. The different strengths and weaknesses of these two studies provided some protection against the problems of depending on only a single research design. For example, the first study provided a large sample, spatial, perceptual, and psychomotor tests, and a longitudinal, predictive design; however, the dependent variable was highly skewed and the measures could not be customized for the purposes of this research. The only accident data available for use as a dependent variable in Study 1 were those in USASC files. The USASC files did not include all accidents involving Army military personnel that are of interest: These files only contain data for accidents which meet minimum criteria for cost, work time lost, or injury to Army military personnel. Many POV accidents are not included in USASC records. Thus, the range of possible values for the criteria were restricted. Range restriction can attenuate relationships between predictors and criteria and may account for some of the lack of support for hypotheses. The fact that less than 2% of the sample had an accident record may also account for the

failure to support hypotheses when using the Had an Accident criteria. In addition, many measures used in Study 1 had been developed for other purposes and did not always carefully fit the construct we desired to measure.

The second study succeeded in reducing the uneven distribution on the accident involvement criterion and provided an opportunity to use customized measures. Soldiers responding as subjects in the new data collection were asked to provide self-reports of their accident histories that provided specific details that were of particular interest in this research. However, soldiers may have had some hesitancy about responding to some sensitive questions about accident histories and a fear that the information could be used against them personally. In addition, individuals are likely to forget details of accidents that occurred prior to the past few years. So, memory lapses and fears of consequences for responding honestly might have reduced the validity of the information obtained from the self-reports. The fact that only 30 of the accidents recorded in USASC records were not also reported in soldiers self reports suggests that this may not have been a serious problem in this study. However, there was some disagreement between USASC and self-report records of drivers' role in causing the accidents.

Additional problems with the second study include the fact that it had a smaller sample than optimal for statistical power and used a postdictive design. One cannot determine the direction of causation between independent and dependent variables in this research. The Army might want to conduct follow-up research with the 551 soldiers used in the second sample. One could collect data in the future on the accident records of these soldiers to look at the relationships in a predictive, rather than postdictive, design. Such data would enable one to draw stronger conclusions about the causal order of soldiers' characteristics and accident involvement.

Even without the possible follow-up research at a future date, at the present time one may have considerable confidence in results that are consistent across both Studies 1 and 2. The use of two separate samples and different research designs with contrasting advantages and disadvantages is a particular strength of this research. Recommendations for how the Army could use these results are based on the strongest results and those results that are consistent across the two studies.

Recommendations

These recommendations are designed to provide information that commanders can use to select safer drivers from among soldiers in their units and to inform soldiers of information that might help them reduce their likelihood of accident involvement. Table 2 summarizes our recommendations for selecting soldiers for driving assignments. Table 3 summarizes other guidelines for communicating with and supervising soldiers.

Among the personal characteristics that commanders may use to select drivers from among soldiers are Perceptual Aptitudes. Perceptual Aptitudes involve accurate perception of visual information, rapid scanning of visual information without being distracted by irrelevancies, accurate use of eye-hand coordination, and making correct choices under time pressure (e.g., correctly identify a target). These types of aptitudes might be observed in activities such as target practice or operating equipment that requires perceptual and motor skills. The lowest 20% of soldiers on Perceptual Accuracy had 33% more accidents and 22% more fatalities than soldiers who were

average on Perceptual Accuracy; they had 45% more accidents and 56% more fatalities than soldiers who were in the top 20% on Perceptual Accuracy. The slowest 20% of soldiers on Perceptual Movement Time had 15% higher cost accidents than other soldiers, 22% more fatalities than the average soldier on this measure, and 2.3 times as many accidents as the top 20% of soldiers on this measure (the fastest 20% of soldiers). Among the tests included in this study, the Choice Reaction Test and Perceptual Speed and Accuracy Test showed the most significant relationships to accident outcomes. If one wished to use a test to measure perceptual aptitudes related to driving, the results of this research suggest that these would be the most useful tests.

Another personal characteristic that can be used to select drivers is interest in Rugged Individualism/Outdoor activities. These activities include exploring wilderness areas, hunting, trail biking, using combat and survival skills, skydiving, camping, and handling firearms. Some of these activities are characterized by high degrees of physical activity and risk. It is the 20% of soldiers who liked these activities the most who had the highest cost accidents, most injuries per accident, and most fatalities per accident (78% higher costs, 22% more injuries, and two times as many fatalities as the average soldier on this profile, and 2 times the cost, 55% more injuries, and 2.8 times as many fatalities as the 20% of soldiers who were lowest on this profile). Thus, soldiers who are extremely high on these types of interests may be generally considered at higher risk of having more serious accidents.

Results for Study 1 showed negative relationships between performance ratings on Following Regulations/Orders and Personal Discipline and accident criteria, and results for Study 2 showed negative relationships between the Dependability (i.e., nondelinquency) temperament scale and accident criteria. On the 7-point scale used to assess soldiers' performance on Following Regulations/Orders, the 1 or 2 rating was described as, "Often fails to follow Army/unit rules, regulations, or orders; may show disrepect toward superiors." Soldiers who received the 1 or 2 rating had a 46% higher accident rate than those who were rated 3, 4, or 5. The 3, 4, and 5 ratings were given to soldiers who fit the following description: "Almost always follows Army/unit rules and regulations; always obeys orders." Those with a 1 or 2 rating had a 73% higher accident rate than those with a 6 or 7 rating. These ratings were given to soldiers who fit the description: "Carefully follows the spirit and letter of Army/unit rules and regulations; obeys orders quickly and with enthusiasm." Thus, those soldiers who most often follow regulations and orders and who are dependable and conscientious in their behavior may be considered those who are least likely to be involved in accidents.

Similarly, positive attitudes about Army discipline may also be considered a personal characteristic related to less likelihood of accident involvement. Soldiers who disagreed with the statement, "In the Army, when individuals disobey order or rules, they are usually punished appropriately," had 54% more at-fault accidents than soldiers who were neutral or agreed that discipline is appropriate. Soldiers who disagreed with the statement, "If you commit an offense while in the Army, you can expect strong punishment," had 78% more accidents than soldiers who were neutral or agreed with the statement. In addition, soldiers who disagreed or were neutral on this statement had 77% more accidents in USASC records than soldiers who agreed with the statement.

Soldiers' driving history, included in the DA Form 348 or computerized personnel records, can also be of use in selecting soldiers. In particular, the Number of Tickets for moving violations since a soldier was licensed is related to the number of accidents soldiers have had in the last 5 years: .13 accidents for soldiers with 0 tickets, .33 accidents with 1-4 tickets, .46 accidents with 5-7 tickets, .52 accidents with 8-10 tickets, .88 accidents with 11-15 tickets, and 2.00 accidents with 16 or more tickets.

Two other factors to consider are whether a soldier gets adequate sleep or has a hearing limitation. Those who get inadequate sleep had 2.12 accidents in 5 years compared with those who get adequate sleep who had .91 accidents in 5 years. This data was based on the soldiers' opinion of whether they get adequate sleep. Sleep experts consider 8 hours of sleep per night to be adequate for the average adult. The majority of soldiers surveyed in Study 2 indicated they get 7 or fewer hours of sleep per night. Soldiers with a hearing limitation in their physical profile in the EMF records had higher average accident costs ($85,000) than those with no limitation ($10,000).

The above characteristics can be used to select soldiers for driving assignments. Other information learned in this research can be used to inform soldiers of factors related to accident involvement and severity. These are summarized in Table 3 and include the speed of the traffic on the road and of the driver's vehicle. The 20% of soldiers whose judgments of safe speeds needed to maintain safety given weather, road, and personal conditions deviated the most from others' judgments had 54% higher cost accidents, 2.4 more at-fault accidents, and 25% more total accidents than the other soldiers. Soldiers tend to underestimate the influence of stress and illness on accident involvement. Major life events, like divorce, relationship breakup, and getting married can cause temporary stressors related to increased likelihood of accident involvement. Passenger distractions, vehicles in need of repair, driving late at night on weekends, failure to use seatbelts and protective equipment, and driving under the influence of alcohol were all found to be significant factors related to accident involvement or severity in this research.

In addition to informing or reminding soldiers that such factors are related to accident involvement and severity, commanders need to (1) continue to demonstrate that discipline is applied appropriately, contingent on behavior, and should be taken seriously; (2) maintain and use soldiers' driving history records; and (3) be sure that accident report forms are filled out as completely as possible with a minimum of missing information.

In conclusion, results in these two studies are consistent with earlier research conducted by the USASC and many other accident researchers, but also provide new information, and in

particular, information specific to Army drivers. Results show that stable personal characteristics can be helpful in selecting drivers from among soldiers; however, transient circumstances (e.g., stress, fatigue, time of day) are also important factors influencing accident involvement and severity. Leadership and communication are needed, in addition to selection, to help reduce accidents, fatalities, and injuries among soldiers.

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Table 1

Summary of Results for Hypothesis Tests for Study 1 and Study 2

Hypothesis	Subject	Hypothesized Direction With Accident Criteria	Study 1 Results	Study 2 Results
1	Cognitive Aptitude	negative	mixed support-in both the hypothesized and opposite directions; correlations with Had an Accident mostly negative	mixed support-both negative and positive correlations and regression coefficients; no clear conclusion can be drawn
2	Spatial Aptitude	negative	no support	mixed support-no significant results in multivariate analyses
3a	Perceptual & Psychomotor Aptitude-Accuracy	negative	support-Simple Reaction, Choice Reaction, Basic Accuracy, Perceptual Accuracy, Psychomotor	support-Waypoint Test had some significant relationships in all analyses
3b	Perceptual & Psychomotor Aptitude-Longer Response Times	positive	mixed support-opposite direction on Simple & Choice Reaction, Cannon Shoot; in the direction hypothesized on Perceptual Speed	support-Waypoint Test combines accuracy & speed in a single score
4	Type A Subscales	positive	no support	no support

Table 1 (continued)

Summary of Results for Hypothesis Tests for Study 1 and Study 2

Hypothesis	Subject	Hypothesized Direction With Accident Criteria	Study 1 Results	Study 2 Results
5	Agreeableness	negative	no support	some support-in preliminary regressions
6	Social Deviance	positive	mixed-no support on Nondelinquency; one negative coefficient for Dependability with Had an Accident	some support-negative correlations for Dependability with Self-Report, Total, and Total At-Fault Accidents; negative coefficients for Dependability with Severity, Injury, and Self-Report Accidents
7a	Driving-Specific Internal Locus of Control	negative	no support	no support
7b	Driving-Specific External Locus of Control	positive	no support	no support
8	Thrill Seeking	positive	support-Rugged Individualism scale & composite	no support-results in opposite direction

Table 1 (continued)

Summary of Results for Hypothesis Tests for Study 1 and Study 2

Hypothesis	Subject	Hypothesized Direction With Accident Criteria	Study 1 Results	Study 2 Results
9	Impulsivity	positive	not measured	some support-marginal positive relationships in correlations, regressions
10	Conscientiousness	negative	mixed-support based on Following Regulations/ Orders scale & Personal Discipline composite; correlations and coefficients for Work Orientation in wrong direction	mixed support-nothing in correlations; one marginally significant negative coefficient for Work Orientation with Injury
11	Risky Driving Behaviors	positive	not measured	no support
12	Number of Tickets	positive	not measured (positive relationships with some types of Enlistment Waivers)	strong support-significant in all types of analyses
13	Negative Attitudes About Safety, Laws, & Regulations	positive	not measured	support-Speed Judgment test, Attitudes Toward Army Discipline; in all types of analyses

Table 1 (continued)

Table 2

Recommendations for Selecting Soldiers for Driving Assignments

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Select Soldiers Who:

1. Have few or no moving violation tickets.
2. Obey order/regulations.
3. Have a positive attitude toward Army discipline and take it seriously.
4. Have accurate perceptual motor skills, including under time pressure.
5. Do not have uncorrected hearing limitations.
6. Do not have extremely high interests on "Rugged Individualism/Outdoors" activities
7. Use safety equipment and seatbelts as instructed and on a regular basis.
8. Do not drink and drive.
9. Get adequate sleep and are not on fatiguing medication.*
10. Are not going through periods of high stress.*

Note. In making judgments on these factors, one should compare soldiers to other soldiers; the research on which these recommendations are based included only enlisted soldiers in the U.S. Army, so all comparisons are for soldiers relative to other soldiers. Although one may prefer that the vast majority of soldiers be highly interested in "Rugged Individualism/Outdoors" activities, it is the top 20% among the soldiers in this research who had more severe accidents relative to other soldiers.

*Items 9 and 10 may be transient conditions important for making short-term driving assignments, not for making longer-term assignments.

Table 3

Guidelines for Communicating with and Supervising Soldiers Related to Reducing Accident Involvement and Severity

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Communicate to soldiers:

1. If stressed or ill one is more likely to be in accidents – stress can come from both positive and negative events.

2. Late weekend nights are the most dangerous driving time – be extra cautious or avoid driving at these times.

3. Driving while fatigued is related to accident involvement and severity – make overnight stops to sleep and don't drive while taking fatiguing medication.

4. Seatbelts and other protective equipment, like helmets, do save lives, prevent injuries, and save money.

5. Decreased hearing ability is related to accident severity – correct hearing disabilities and keep music and noise low enough to hear other traffic.

6. More severe accidents happen on higher speed roadways and when drivers are speeding.

7. Vehicles in need of repair can cause more serious accidents.

8. Don't drink and drive – research strongly supports the relationship between alcohol use and alcohol involvement and severity.

In addition:

1. Continue to demonstrate that discipline is applied appropriately, contingent on behavior, and should be taken seriously in the Army.

2. Maintain and make use of up-to-date driving history records for your soldiers (i.e., DA Form 348).

3. Be sure accident report forms are filled out completely; minimize missing data; information is important for improving knowledge about how to reduce accidents.

APPENDIX A

Table A1

Study 1: Descriptive Statistics for Dependent Variables

Variable	M	SD	n
Total Cost	22,418.43	46,932.59	734
Number of Injuries	.88	1.09	734
Number of Fatalities	.13	.37	734
Severity	1.95	.89	734
Had an Accident	.01	.11	60,560

Note. For the first four dependent variables describing seriousness of accidents, accidents are treated as the cases; for Had an Accident, individuals are treated as cases.

Table A2

Study 1: Descriptive Statistics for General Aptitude (ASVAB) Scores

Aptitude Test	Accident Only Sample M	Accident Only Sample SD	Total Sample M	Total Sample SD
1980 Version of Standardized ASVAB Subtest Scores				
General Science	51.77	7.37	52.08	7.70
Arithmetic Reasoning	51.61	7.07	52.20	7.15
Word Knowledge	51.98	5.91	52.60	5.85
Paragraph Comprehension	52.57	6.21	53.28	6.03
Numerical Operations	54.52	6.28	54.41	6.33
Coding Speed	52.72	6.64	53.20	6.87
Auto/Shop Information	52.48	8.42	52.67	8.52
Mathematics Knowledge	51.21	7.79	51.27	7.77
Mechanical Comprehension	53.14	8.38	53.53	8.29
Electronics Information	50.73	8.24	51.32	8.33
Verbal	52.24	5.50	52.93	5.52
1980 Version of Area Composite Scores				
General Technical	104.25	11.43	105.62	11.68
General Maintenance	103.71	14.22	104.38	14.57
Electrical	103.08	13.62	103.97	13.86
Clerical	103.79	12.28	104.76	12.50
Mechanical Maintenance	106.66	12.94	107.30	13.21
Signal Communication	105.61	13.48	106.72	13.54
Combat	106.31	12.97	107.35	13.01
Field Artillery	105.27	12.81	106.18	12.91
Operators/Food Service	107.70	11.36	108.41	11.63
Skilled/Technical	104.86	13.24	105.70	13.54

Table A2 (continued)

Study 1: Descriptive Statistics for General Aptitude (ASVAB) Scores

Aptitude Test	Accident Only Sample M	Accident Only Sample SD	Total Sample M	Total Sample SD
		ASVAB Factors		
Technical	130.99	17.92	131.86	18.03
Quantitative	102.82	13.59	103.47	13.68
Verbal	104.01	11.98	105.01	12.31
Speed	107.23	11.31	107.61	11.48
		AFQT Scores		
New 1980	55.80	18.29	57.93	18.98
New 1989	54.02	19.46	55.90	19.89

Note. n = 721 for the Accident Only Sample, and n = 58,664 for the Total Sample.

Table A3

Study 1: Descriptive Statistics for Spatial Aptitude Test Scores

	Accident Only Sample		Total Sample	
Aptitude Test	M	SD	M	SD
Assembling Objects	23.44	7.06	23.53	7.17
Map	7.62	5.30	7.82	5.45
Maze	16.86	4.90	16.95	4.83
Object Rotation	58.74	19.42	59.19	19.99
Orientation	11.74	6.16	12.17	6.20
Figural Reasoning	19.22	5.53	19.52	5.43

Note. n = 489 for the Accident Only Sample, and n = 37,957 for the Total Sample.

Table A4

Study 1: Descriptive Statistics for Perceptual and Psychomotor Aptitude Test Scores

	Accident Only Sample			Total Sample		
Aptitude Test	M	SD	n	M	SD	n
Simple Reaction Time						
Proportion Correct	.98	.06	494	.98	.05	38,075
Median Decision Time	292.08	150.81	494	285.79	83.36	38,075
Median Movement Time	226.64	58.22	491	228.86	62.57	37,924
Choice Reaction Time						
Proportion Correct	.98	.04	494	.98	.04	38,075
Median Decision Time	389.85	93.59	494	386.78	82.50	38,075
Median Movement Time	232.13	51.47	492	234.29	50.80	38,029
Perceptual Speed and Accuracy						
Proportion Correct	.84	.09	494	.86	.09	38,075
Median Movement Time	297.48	91.16	491	295.86	87.79	37,911
Mean of Clipped Decision Times	2,253.97	634.26	494	2,281.13	640.69	38,075
Short Term Memory						
Proportion Correct	.88	.09	494	.89	.08	38,075
Median Movement Time	333.53	108.16	494	338.72	112.69	37,678
Mean of Clipped Decision Times	800.32	225.60	491	813.11	225.01	38,075
Target Identification						
Proportion Correct	.89	.09	494	.90	.09	38,075
Median Movement Time	322.17	78.43	483	323.16	81.48	37,590
Mean of Clipped Decision Times	1809.28	622.29	494	1812.36	616.15	38,075

Table A4 (continued)

Study 1: Descriptive Statistics for Perceptual and Psychomotor Aptitude Test Scores

	Accident Only Sample			Total Sample		
Aptitude Test	M	SD	n	M	SD	n
			Number Memory Test			
Proportion Correct	.85	.10	494	.86	.10	38,075
Mean Time to Make Initial Response	1443.49	536.62	483	1420.51	534.59	37,535
Mean Time to Make Final Response	1564.23	480.24	483	1539.46	421.73	37,535
Mean Reaction Time for Arithmetic Operations	2109.22	716.11	494	2101.79	755.02	38,075
			Target Tracking Test			
Test 1: Control/Precision	2.93	.49	494	2.93	.49	38,075
Test 2: Multilimb Coord	3.61	.52	494	3.59	.52	38,075
			Cannon Shoot Test			
Mean of Discrepancy Between Actual and Optimal Firing Time	438.43	92.55	494	444.81	98.21	38,075
			Target Shoot			
Mean Accuracy Score	2.19	.24	494	2.20	.24	38,075
Mean Speed: Time to Fire	2332.59	516.93	483	2311.42	505.11	36,691

Table A4 (continued)

Study 1: Descriptive Statistics for Perceptual and Psychomotor Aptitude Test Scores

Aptitude Test	Accident Only Sample M	Accident Only Sample SD	Accident Only Sample n	Total Sample M	Total Sample SD	Total Sample n
		Composite Scores				
Psychomotor	200.56	31.47	491	200.11	31.92	37,972
Perceptual Speed	100.47	17.62	491	100.01	17.53	37,985
Perceptual Accuracy	98.41	16.69	491	100.04	16.33	37,987
Number Speed and Accuracy	99.34	14.95	483	100.09	15.37	37,549
Basic Speed	98.94	24.80	492	100.01	16.65	38,061
Basic Accuracy	99.14	18.15	492	100.01	15.54	38,061
Short Term Memory	100.21	17.27	491	100.06	14.92	37,678
Movement Time	50.28	9.72	481	50.04	9.96	37,067

Table A5

Study 1: Descriptive Statistics for ABLE Temperament Scores

	Accident Only Sample			Total Sample		
Temperament Variable	M	SD	n	M	SD	n
			Scale Scores			
Dominance	27.35	4.43	473	27.15	4.63	36,728
Cooperativeness	44.16	5.28	473	44.36	4.97	36,728
Nondelinquency	47.45	5.51	473	47.64	5.59	36,728
Traditional Values	29.10	2.72	473	28.98	2.94	36,728
Internal Control	41.77	4.16	473	41.71	4.45	36,728
Conscientiousness	36.76	3.99	473	36.65	4.13	36,728
Work Orientation	45.04	6.25	473	45.16	6.18	36,728
Emotional Stability	40.14	5.47	473	39.97	5.61	36,728
Self Esteem	28.66	3.71	473	28.72	3.96	36,728
Energy Level	50.41	5.71	473	50.33	6.09	36,728
Physical Condition	13.45	2.79	473	13.33	3.03	36,728
Social Desirability	17.03	3.38	446	16.84	3.37	34,653
Self-Knowledge	26.31	3.04	446	26.24	3.17	34,664
Non-Random Response	7.22	1.42	494	1.29	1.29	38,083
Poor Impression	1.07	1.48	446	1.67	1.67	34,668
			Composites			
Achievement Orientation	150.21	25.27	446	150.03	26.64	34,675
Leadership	50.53	9.52	445	49.94	9.94	34,664
Adjustment	50.40	9.60	446	50.03	9.91	34,676
Cooperativeness	49.87	10.49	446	50.23	9.88	34,670
Internal Control	50.16	9.32	446	49.94	9.97	34,667
Physical Condition	50.05	9.23	445	49.70	10.01	34,674
Dependability	151.20	24.25	446	150.59	25.09	34,664

Table A5 (continued)

Study 1: Descriptive Statistics for ABLE Temperament Scores

Temperament Variable	Accident Only Sample M	SD	n	Total Sample M	SD	n
		Factor Scores (168 items)				
Dominance	53.26	7.35	446	53.06	7.64	34,668
Cooperation	39.47	4.72	446	39.60	4.52	34,671
Locus of Control	45.70	4.14	446	45.58	4.36	34,665
Dependability	79.48	8.62	446	79.55	8.67	34,645
Work-Orientation	110.19	12.24	446	109.92	12.54	34,672
Stress Tolerance	68.85	8.60	446	68.52	9.03	34,668
Physical Condition	18.30	3.28	445	18.22	3.55	34,674
		Factor Scores (114 items)				
Dominance	43.40	6.42	446	43.26	6.67	34,669
Cooperation	25.00	3.16	446	25.07	3.05	34,668
Locus of Control	35.56	3.30	445	35.40	3.50	34,605
Dependability	52.23	6.25	446	52.22	6.26	34,644
Work Orientation	67.90	8.54	446	67.81	8.75	34,660
Stress Tolerance	35.86	5.12	446	35.60	5.27	34,675
Physical Condition	18.30	3.28	445	18.22	3.55	34,674

Table A6

Study 1: Descriptive Statistics for Job Values (JOB) Scores

Job Value	Accident Only Sample M	Accident Only Sample SD	Accident Only Sample n	Total Sample M	Total Sample SD	Total Sample n
		Scale Scores				
Pride	43.99	4.31	486	44.02	4.21	37,497
Security/Comfort	26.93	2.47	486	27.05	2.46	37,497
Serving Others	12.08	1.98	486	12.05	2.04	37,497
Job Autonomy	14.53	2.39	486	14.57	2.44	37,497
Routine	11.64	2.65	486	11.58	2.72	37,497
Ambition	16.47	2.18	486	16.40	2.23	37,497
		Composite Scores				
Routine	50.32	9.71	465	49.95	9.96	36,239
Autonomy	49.65	9.88	461	49.81	10.03	36,276
High Expectations	201.55	30.69	473	201.15	30.59	36,766

Table A7

Study 1: Descriptive Statistics for Occupational Interest (AVOICE) Scores

Interest	Accident Only Sample M	Accident Only Sample SD	Accident Only Sample n	Total Sample M	Total Sample SD	Total Sample n
			Scale Scores			
Rugged Individualism	58.83	10.35	480	58.92	10.37	37,167
Leadership/Guidance	41.37	8.12	480	41.42	8.28	37,167
Law Enforcement	27.55	6.68	480	26.83	6.73	37,167
Firearms Enthusiast	25.37	5.55	480	24.99	5.76	37,167
Aesthetics	13.99	4.10	480	14.43	4.05	37,167
Fire Protection	19.91	4.49	480	19.76	4.37	37,167
Vehicle Operator	18.00	4.52	480	17.87	4.49	37,167
Unlikely Response	1.08	1.66	494	1.11	1.74	38,083
			Composite Scores			
Social	100.36	17.92	466	100.56	17.50	36,133
Rugged/Outdoors	149.70	26.10	466	148.20	27.04	36,132
Audiovisual Arts	148.73	24.22	466	150.37	23.05	36,125
Skilled/Technical	200.07	32.10	466	200.55	30.63	36,144
Administrative	101.10	18.12	466	100.77	18.33	36,145
Food Services	99.16	18.69	466	100.27	18.77	36,144
Protective Services	101.22	17.85	466	99.62	17.54	36,145
Structural Machines	202.47	31.11	466	199.81	32.19	36,144

Table A8

Study 1: Descriptive Statistics for End-of-Training Tests and Army-Wide Performance Ratings

	Accident Only Sample			Total Sample		
Score/Rating	M	SD	n	M	SD	n
			Scale Scores			
Total Knowledge Score	58.01	15.36	432	59.08	14.92	31,260
Technical Knowledge Score	63.38	13.59	603	63.11	12.63	43,618
Basic Knowledge Score	61.56	12.05	603	62.04	11.52	43,618
		Performance Ratings by Peers and Supervisors				
Technical Skill	4.51	.89	602	4.59	.91	43,751
Effort	4.33	.96	602	4.42	1.03	43,751
Following Regs/Orders	4.43	1.09	602	4.61	1.06	43,751
Military Appearance	4.75	.83	602	4.75	.92	43,751
Physical Fitness	4.86	.94	602	4.75	1.06	43,751
Self-Control	4.57	1.13	602	4.72	1.15	43,751
Leadership Potential	4.10	1.15	602	4.16	1.20	43,751
Effort/Technical Skill	4.42	.86	602	4.50	.90	43,751
Personal Discipline	4.50	.10	602	4.66	1.00	43,751
Physical Fitness/Bearing	4.80	.75	602	4.75	.86	43,751

Table A9

Study 1: Descriptive Statistics for Driving Behavior and History Variables

Variable	Accident Only Sample			Total Sample		
	M	SD	n	M	SD	n
Enlistment Waivers						
Having Any Waiver	.093	.33	734	.069	.27	60,560
No Need for Waiver	.916	.28	734	.932	.25	60,560
Minor Non-Traffic Related	.008	.09	734	.006	.08	60,560
Minor Traffic Related	.003	.05	734	.001	.03	60,560
Misdemeanor Conviction	.057	.23	734	.053	.22	60,560
Felony Conviction	.003	.05	734	.001	.02	60,560
Other Offense	.014	.12	734	.007	.09	60,560
Accident Errors in Safety Center Accident Record						
No Accident Error	.072	.26	734	--	--	--
Speeding	.003	.05	734	--	--	--
Reckless Violations	.297	.46	734	--	--	--
Bad Judgment	.286	.45	734	--	--	--
Improper Equipment Use	.035	.19	734	--	--	--
Poor Planning	.023	.15	734	--	--	--
Poor Driving Skill	.296	.46	734	--	--	--
Fatigue/Inattention	.200	.40	734	--	--	--

Note. Dashes indicate that data are available only for those who had an accident. Accident errors were coded one if mentioned in USASC record and zero if not mentioned.

Table A10

Study 1: Descriptive Statistics for Transient Situational Factors for Accident Only Sample

Factor	M	SD	n
Time, Location, and Other Conditions			
Year of Accident	1989	2.59	734
Weekend Night Hour	.16	.37	734
Daylight	.66	.48	734
Outside Continental U.S.	1.33	.47	734
Fatality Rate in State	18.08	4.60	511
On Post	.37	.48	734
On Duty	.59	.49	734
During Field Training	.20	.40	734
During Tactical Training	.19	.39	734
During Either Type Training	.22	.41	734
Environmental/Weather Problem	.36	.48	734
Using Seatbelt/ Protective Equipment	.55	.50	487
Type of Roadway			
Road Speed	1.94	.39	734
Highway Accident	.01	.08	734
Street Accident	.85	.36	734
Country Road Accident	.05	.22	734
Off Road Accident	.05	.21	734
Parking Lot/Building Accident	.05	.21	734
Vehicle Type			
Vehicle Size	2.74	1.12	734
Motorcycle	.12	.33	734
Automobile	.35	.47	734
Small Truck	.14	.35	734
Jeep/Humvee	.09	.28	734

Table A10 (continued)

Study 1: Descriptive Statistics for Transient Situational Factors for Accident Only Sample

Factor	M	SD	n
Van	.05	.23	734
Large Truck	.12	.33	734
Bus	.01	.08	734
Fighting Vehicle	.07	.26	734
Other Army Vehicle	.05	.22	734
Privately Owned Vehicle	.44	.50	734

Table A11

Study 1: Descriptive Statistics for Transient Personal Factors for Accident Only Sample

Factor	M	SD	n
Hours of Sleep	6.82	2.50	209
Continuous Hours on Duty	7.20	6.39	440
Alcohol Use in Accident	.07	.25	266
Age at Time of Accident	22.46	4.74	734

Table A12

Study 1: Descriptive Statistics for Demographic Variables

Variable	Accident Only Sample M	Accident Only Sample SD	Total Sample M	Total Sample SD
Physical and Psychiatric Characteristics				
Height in Inches	69.17	2.91	69.03	3.05
Hearing Limitation	.03	.18	.03	.16
Eyesight Limitation	.21	.41	.23	.42
Physical Limitation	.01	.16	.09	.13
Gender, Marital Status, Race, Rank, Education				
Gender[a]	.08	.27	.11	.31
Married	.09	.28	.11	.31
Divorced	.02	.13	.02	.12
Single	.88	.32	.85	.36
Number of Dependents	.21	1.13	.00	.00
White	.65	.48	.70	.46
Black	.27	.44	.23	.42
Other Race/Ethnicity	.07	.25	.05	.22
Pay Grade E1	.03	.17	.33	.47
Pay Grade E2	.16	.37	.36	.48
Pay Grade E3	.28	.45	.20	.40
Pay Grade E4	.37	.48	.02	.13
Pay Grade E5	.11	.31	.00	.04
Pay Grade E6	.04	.19	.00	.01
Pay Grade E7	.01	.07	.00	.05
Years of Education at Accession	11.96	.80	12.00	.88

Table A12 (continued)

Study 1: Descriptive Statistics for Demographic Variables

Temperament Variable	Accident Only Sample M	Accident Only Sample SD	Total Sample M	Total Sample SD
		MOS		
Driving MOS	.62	.49	.45	.50
Air Defense	.02	.13	.01	.11
Adj. General/Admin.	.02	.15	.04	.19
Armored	.05	.22	.04	.19
Aviation	.01	.10	.01	.09
Chemical	.01	.12	.02	.13
Engineer	.05	.21	.04	.19
Field Artillery	.09	.29	.08	.27
Infantry	.19	.40	.22	.42
Medical	.08	.27	.09	.29
Military Intelligence	.00	.04	.01	.07
Military Police	.13	.34	.06	.24
Ordnance	.07	.26	.01	.12
Quartermaster	.09	.29	.11	.31
Signal Corps	.02	.14	.03	.17
Special Operations	.00	.05	.00	.01
Transportation	.10	.30	.07	.25

Note. n=734 for the Accident Only Sample, and n=60,560 for the Total Sample.

[a] n =59,173.

Table A13

Study 1: Correlations Among Criteria Describing the Seriousness of Accidents

	Total Cost	Injuries	Fatalities
Injuries	.34		
Fatalities	.61	.28	
Severity	.65	.47	.79

Note. n=734 accidents. All correlations are significant, p<.01, two-tailed.

Table A14

Study 1: Correlations Between General Cognitive Aptitude and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria				
	Total Cost	Injuries	Fatalities	Severity	Had Accident
New 1980 Standardized ASVAB Subtest Scores					
General Science	.04	.03	.01	.08**	-.01
Arithmetic Reasoning	.01	-.01	-.01	.02	-.01**
Word Knowledge	.04	.02	.03	.06	-.01**
Paragraph Comprehension	.03	.06	.02	.03	-.01**
Numerical Operations	.00	.01	-.02	-.02	.00
Coding Speed	-.03	.02	-.01	-.01	-.01*
Auto/Shop Information	.02	.05	.00	.05	.00
Mathematics Knowledge	.00	.03	.02	.03	.00
Mechanical Comprehension	.03	.02	.01	.04	-.01
Electronics Information	.04	.07*	.00	.07*	-.01*
Verbal	.04	.03	.03	.05	-.01**
New 1980 Area Composite Scores					
General Technical	.03	.01	.01	.04	-.01**
General Maintenance	.03	.06	.01	.07*	-.01
Electrical	.03	.04	.01	.06*	-.01
Clerical	.02	.02	.01	.04	-.01**
Mechanical Maintenance	.04	.06	.00	.06	-.01
Signal Communication	.03	.03	.01	.05	-.01**
Combat	.01	.04	.00	.04	-.01**
Field Artillery	.00	.02	.00	.03	-.01*
Operators/Food Service	.03	.05	.01	.05	-.01*
Skilled/Technical	.03	.03	.02	.06	-.01*

Table A14 (continued)

Study 1: Correlations Between General Cognitive Aptitude and Accident Involvement Criteria

	Accident Involvement Criteria				
Aptitude Test	Total Cost	Injuries	Fatalities	Severity	Had Accident
		ASVAB Factors			
Technical	.03	.05	.01	.06	-.01
Quantitative	.00	.01	.01	.03	-.01
Verbal	.04	.03	.02	.07*	-.01**
Speed	-.02	.02	-.02	-.01	.00
		AFQT Scores			
New 1980	.03	.02	.01	.04	-.01**
New 1989	.03	.03	.02	.05	-.01**

Note. n = 721 for the first four dependent variables, and n = 58,675 for Had an Accident.

*$p < .10$. **$p < .05$, two-tailed.

Table A15

Study 1: Relationship Between Spatial Aptitude Test Scores and Accident Involvement Criteria

	Accident Involvement Criteria				
Aptitude Test	Total Cost	Injuries	Fatalities	Severity	Had Accident
Assembling Objects	.03	.04	-.05	-.04	.00
Map Test	-.02	.03	-.03	.01	.00
Maze Test	.00	.05	.02	.00	.00
Object Rotation	-.06	.03	-.05	-.02	.00
Orientation	-.02	-.01	-.06	-.02	-.01
Figural Reasoning	-.03	-.01	-.05	-.05	-.01

Note. $n = 489$ for the first four dependent variables, and $n = 37,964$ for Had an Accident.

$^*p < .10$. $^{**}p < .05$, two-tailed.

Table A16

Study 1: Correlations Between Perceptual and Psychomotor Aptitude and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria				
	Total Cost	Injuries	Fatalities	Severity	Had Accident
Simple Reaction Time					
Proportion Correct	-.02	-.02	-.09*	-.03	.00
Median Decision Time	-.05	.06	-.04	-.01	.01*
Median Movement Time	-.07	-.07	-.11**	-.09**	.00
Choice Reaction Time					
Proportion Correct	-.05	-.11**	-.16**	-.14**	-.01
Median Decision Time	-.06	.03	-.05	.01	.00
Median Movement Time	-.02	-.07	-.09**	-.08**	-.01
Perceptual Speed and Accuracy					
Proportion Correct	.06	.00	.02	.02	-.02**
Median Movement Time	.03	.00	.07	.07	.00
Mean of Clipped Decision Times	.10**	-.06	-.02	.02	-.01
Short Term Memory					
Proportion Correct	.05	.03	.03	.05	.00
Median Movement Time	.00	-.07	.03	.01	-.01
Mean of Clipped Decision Times	.04	-.02	.04	.03	-.01
Target Identification					
Proportion Correct	.04	-.04	.02	-.01	.00
Median Movement Time	-.03	-.03	.02	.01	.00
Mean of Clipped Decision Time	.06	-.04	.02	.06	.00

Table A16 (continued)

Study 1: Correlations Between Perceptual and Psychomotor Aptitude and Accident Involvement Criteria

	Accident Involvement Criteria				
Aptitude Test	Total Cost	Injuries	Fatalities	Severity	Had Accident
		Number Memory Test			
Proportion Correct	.02	-.03	-.04	-.02	-.01*
Mean Time to Make Initial Response	-.03	-.07	-.07	-.02	.01
Mean Time to Make Final Response	-.03	-.02	-.03	-.04	.01
Mean Reaction Time for Arithmetic Operations	.02	-.07	.00	.01	.00
		Target Tracking Test			
Test 1: Control/Precision	.01	-.01	-.02	-.04	.00
Test 2: Multilimb Coordination	-.01	-.04	-.02	-.05	.01
		Cannon Shoot Test			
Mean of Discrepancy Between Actual and Optimal Firing Time	-.07	-.09*	-.04	-.08*	-.01
		Target Shoot			
Mean Accuracy Score	-.01	-.06	-.04	-.07	.00
Mean Speed: Time to Fire	-.04	.00	.00	.00	.01

Table A16 (continued)

Study 1: Correlations Between Perceptual and Psychomotor Aptitude and Accident Involvement Criteria

	Accident Involvement Criteria				
Aptitude Test	Total Cost	Injuries	Fatalities	Severity	Had Accident
	Composite Scores				
Psychomotor	.02	.06	.04	.07	.00
Perceptual Speed	-.09*	.05	.00	-.05	.00
Perceptual Accuracy	.06	-.02	.02	.01	-.01**
Number Speed and Accuracy	.01	.03	-.02	-.01	-.01
Basic Speed	.06	-.05	.05	.00	-.01
Basic Accuracy	-.04	-.08*	-.15**	-.10**	-.01
Short Term Memory	.01	.03	.00	.02	.00
Movement Time	.02	.05	.00	.01	.00

Note. n = 494 for the first four dependent variables, and n = 36,697 to 38,082 for Had an Accident.

*p < .10. **p < .05, two-tailed.

Table A17

Study 1: Correlations Between ABLE Temperament Scores and Accident Involvement Criteria

	Accident Involvement Criteria				
Temperament Variable	Total Cost	Injuries	Fatalities	Severity	Had Accident
		Scales			
Dominance	.07	.06	.04	.04	.01
Cooperativeness	.06	-.05	.05	.03	-.01
Nondelinquency	.05	-.01	.05	.03	-.00
Traditional Values	-.02	-.03	.00	-.01	.00
Internal Control	.03	-.02	.03	.01	.00
Conscientiousness	.02	-.05	.03	-.01	.00
Work Orientation	.08*	.03	.03	.08**	-.00
Emotional Stability	.10**	.02	.09**	.08	.00
Self Esteem	.06	.02	.03	.01	-.00
Energy Level	.05	-.03	.04	.01	.00
Physical Condition	.06	.01	.06	.04	.01
Social Desirability	.01	.05	.06	.07	.01
Self Knowledge	.02	-.02	-.00	.02	.00
Non-Random Response	.03	-.03	-.07	-.07	-.01**
Poor Impression	-.07	.01	-.11**	-.03	-.01*
		Composites			
Achievement Orientation	.06	.03	.07	.06	.00
Leadership	.06	.07	.05	.05	.01
Adjustment	.10**	.04	.13**	.11**	.00
Cooperativeness	.05	-.04	.06	.04	-.00
Internal Control	.04	-.01	.04	.02	.00
Physical Condition	.05	.02	.07	.05	.00
Dependability	.02	-.05	.03	-.00	.00

Table A17 (continued)

Study 1: Correlations Between ABLE Temperament Scores and Accident Involvement Criteria

Temperament Variable	Total Cost	Injuries	Fatalities	Severity	Had Accident
	Accident Involvement Criteria				
	Factor Scores (168 items)				
Dominance	.06	.06	.06	.04	.00
Cooperation	.05	-.06	.06	.03	.00
Locus of Control	.00	-.01	.03	-.01	.00
Dependability	.04	-.04	.03	-.01	-.00
Work-Orientation	.05	.02	.08*	.08*	.00
Stress Tolerance	.08	.02	.10**	.08*	.01
Physical Condition	.06	.04	.07	.05	.00
	Factor Scores (114 items)				
Dominance	.05	.07	.05	.04	.00
Cooperation	.04	-.03	.07	.05	-.00
Locus of Control	.00	.00	.03	.01	.01
Dependability	.03	-.05	.03	-.00	.00
Work-Orientation	.06	.03	.08*	.09**	.00
Stress Tolerance	.09	.01	.12**	.10**	.00
Physical Condition	.06	.04	.07	.05	.00

Note. n = 445-473 for the first four dependent variables, and n = 34,610 to 38,090 for Had an Accident.

*$p < .10$. **$p < .05$.

Table A18

Study 1: Correlations Between Job Values (JOB) Scores and Accident Involvement Criteria

Job Value	Total Cost	Injuries	Fatalities	Severity	Had Accident
	Accident Involvement Criteria				
Scale Scores					
Pride	.06	.03	.07	.05	.00
Security/Comfort	.07	-.03	.07	.03	-.01
Serving Others	.02	-.02	.07	.07	.00
Job Autonomy	.07	.06	.04	.07	.00
Routine	-.05	.01	-.04	-.05	.00
Ambition	.04	.05	.09*	.04	.00
Composite Scores					
Routine	-.05	.01	-.03	-.04	.00
Autonomy	.08	.06	.05	.08*	.00
High Expectations	.07	.01	.10**	.07	.00

Note. n = 461-486 for the first four dependent variables, and n = 36,243 to 37,502 for Had an Accident.

*$p < .10$. **$p < .05$, two-tailed.

Table A19

Study 1: Correlations Between Occupational Interest (AVOICE) Scores and Accident Involvement Criteria

	Accident Involvement Criteria				
Driving Behavior	Total Cost	Injuries	Fatalities	Severity	Had Accident[a]
			Scale Scores		
Rugged Individualism	.12**	.08*	.08*	.16**	.00
Leadership/Guidance	.07	.01	.09*	.11**	.00
Law Enforcement	.02	.03	.01	.04	.01**
Firearms Enthusiast	.08*	.09*	.08*	.12**	.01
Aesthetics	-.02	-.07	-.02	-.02	-.01**
Fire Protection	.06	.02	.07	.08*	.00
Vehicle Operator	.02	-.02	.02	.02	.00
Unlikely Response	-.08*	-.02	-.02	-.07	.00
			Composite Scores		
Social	.04	.01	.10**	.10**	.00
Rugged/Outdoors	.13**	.12**	.12**	.18**	.01
Audiovisual Arts	.10**	.01	.09**	.08*	-.01
Skilled Technical	.06	-.00	.06	.06	.00
Administrative	.01	-.03	.04	.02	.00
Food Services	-.02	-.02	.07	.07	-.01
Protective Services	.04	.03	.06	.08*	.01
Structural Machines	.10**	.06	.08*	.12**	.01*

Note. n=466-494 for the first four dependent variables, and n = 36,129 to 38,090 for Had an Accident.

*p < .10. **p < .05, two-tailed.

Table A20

Study 1: Correlations of End-of-Training Tests and Army-Wide Performance Ratings With Accident Involvement Criteria

	Accident Involvement Criteria				
Rating Scale or Test	Total Cost	Injuries	Fatalities	Severity	Had Accident
	School Knowledge Tests				
Total Knowledge Score	.04	-.02	.03	.03	-.01[a]
Technical Knowledge Score	.03	-.04	.00	-.01	.00[a]
Basic Knowledge Score	.01[b]	.00[b]	.02[b]	.03[b]	-.01[c]
	Performance Ratings by Peers and Supervisors				
Technical Skill	-.02	.02	-.04	.00	-.01**
Effort	.01	-.02	-.03	.00	-.01**
Following Regs./Orders	-.06	-.02	-.19**	-.06	-.02**
Military Appearance	-.01	-.04	-.06	-.15	.00
Physical Fitness	.01	-.03	.00	-.01	.01**
Self-Control	-.01	-.02	-.05	-.05	.02**
Leadership Potential	-.01	.03	-.02	.03	-.01
Effort/Technical Skill	-.01	.00	-.04	.00	-.01**
Personal Discipline	-.04	-.02	-.08**	-.06	-.02**
Physical Fitness/Bearing	.00	-.04	-.04	-.03	.01

Note. n = 602-603 for the first four dependent variables, and 43,761 for Had an Accident, unless otherwise noted.

[a]n = 43,628. [b]n = 31,265. [c]n = 432.

*p < .10. **p < .05, two-tailed.

Table A21

Study 1: Correlations Between Driving Behavior and History and Accident Involvement Criteria

	Accident Involvement Criteria				
Variable	Total Cost	Injuries	Fatalities	Severity	Had Accident
		Enlistment Waivers			
Having Any Waiver	.05	.01	.01	.05	.01
No Need for Waiver	-.05	-.01	-.02	-.06	-.01
Minor Non-Traffic Related	.05	.02	.05	.07*	.00
Minor Traffic Related	-.02	.03	-.02	.00	.01
Misdemeanor Conviction	.06	.04	.06	.09**	.00
Felony Conviction	.04	-.02	-.02	.00	.02**
Other Offenses	-.01	-.03	-.04	-.02	.01
		Accident Errors in Safety Center Accident Record			
No Accident Error	-.01	-.07*	-.05	-.05	--
Speeding	.02	-.02	-.02	-.03	--
Reckless Violations	.07*	.03	.04	.04	--
Bad Judgment	.02	.00	-.00	-.01	--
Improper Equipment Use	.00	-.03	-.01	-.06	--
Poor Planning	-.01	.02	-.03	.01	--
Poor Driving Skill	-.07*	-.04	-.03	-.04	--
Fatigue/Inattention	.04	-.02	.06	.04	--

Note. n=721 for the first four dependent variables, and n=58,675 for Had an Accident.

*p <.10. **p <.05, two-tailed.

Table A22

Study 1: Correlations Between Transient Factors and Accident Involvement Criteria

Control Variable	Accident Involvement Criteria: Total Cost	Injuries	Fatalities	Severity
Time, Location, and Other Conditions				
Year of Accident	.05	-.05	-.04	-.09**
Weekend Night Hour	.12**	.13**	.10**	.18**
Daylight	-.11**	-.14**	-.14**	-.21**
Outside Continental U.S.	-.03	-.10**	-.01	-.13**
Fatality Rate in State[a]	.04	-.05	.04	.07
On Post	-.11**	-.07	-.16**	-.21**
On Duty[c]	-.25**	-.29**	-.24**	-.49**
During Field Training	-.09**	-.05	-.12**	-.13**
During Tactical Training	-.07*	.03	-.11**	-.11**
During Either Type Training	-.09**	.02	-.13**	-.15**
Environmental/Weather Problem[b]	-.02	-.14**	-.13**	-.12**
Age at Time of Accident	-.01	-.06*	-.08**	.08**
Continuous Hours on Duty[c]	.02	.02	-.02	.00
Hours of Sleep[d]	-.04	-.07	-.11	-.00
Alcohol Use	.17**	.15**	.13**	.20**
Using Seatbelt/Protective Equipment	-.11*	-.13**	-.12**	-.20**
Type of Roadway				
Road Speed	.02	.10**	.04	.10**
Highway Accident	.01	-.04	.02	.01
Street Accident	.10**	.08**	.11**	.12**
Country Lane Accident	-.07*	-.02	-.06	-.07*
Off-Road Accident	-.07*	.02	-.06	-.01
Parking Lot/Building Accident	-.05	-.12**	-.08**	-.12**

Table A22 (continued)

Study 1: Correlations Between Transient Factors and Accident Involvement Criteria

Variable	Accident Involvement Criteria: Total Cost	Injuries	Fatalities	Severity
	Vehicle Type[c]			
Vehicle Size	-.14**	-.15**	-.10**	-.25**
Motorcycle	.02	.06	-.05	.11**
Automobile	.13**	.10**	.19**	.23**
Small Truck	.02	.06	-.02	.01
Jeep/Humvee	-.04	-.03	-.09**	-.14**
Van	.00	-.03	-.04	-.10**
Large Truck	-.08**	-.13**	-.03	-.13**
Bus	-.02	-.03	.03	.00
Fighting Vehicle	-.07*	-.02	-.05	-.07*
Other Army Vehicle	-.05	-.09**	-.07*	-.12**
Privately Owned Vehicle	.24**	.29**	.24**	.51**

Note. n = 734 unless otherwise noted.

[a]n = 511. [b]n = 674. [c]n = 440. [d]n = 209.

*p <.10. **p <.05, two-tailed.

Table A23

Study 1: Correlations of Demographic Variables With Accident Involvement Criteria

	Accident Involvement Criteria				
Demographic Variable	Total Cost	Injuries	Fatalities	Severity	Had Accident
Height in Inches[a]	-.07	.00	-.08	-.02	.01
Hearing Limitation[a]	-.02	-.02	-.04	-.05	.00
Eyesight Limitation[a]	.01	-.01	.03	.01	.00
Physical Limitation[a]	-.03	-.04	-.03	-.03	.00
Number of Dependents[b]	-.03	.01	-.05	-.04	.01**
Gender	-.07*	-.05	-.03	-.06*	-.01**
Married	-.07**	.01	-.05	-.04	-.01**
Divorced	.12**	.01	-.02	.02	.00
Single	.02	.01	.06	.04	.01**
White	.05	.09**	.03	.11**	-.01**
Black	-.04	-.08**	-.05	-.11**	.01**
Other Race/Ethnicity	-.04	-.02	.03	-.02	.01
Pay Grade (E1 to E7)[a]	.08**	-.04	-.04	-.08**	.01*
E1[a]	-.02	.02	.03	.05	-.01*
E2[a]	-.02	.03	.01	.02	.02**
E3[a]	-.03	.01	.01	.02	.00
E4[a]	.05	.00	.03	.02	.00
E5[a]	.01	-.07*	-.04	-.05	.01
E6[a]	-.05	.03	-.07*	-.11	.00
E7[a]	-.02	-.03	-.02	-.02	.00
Years of Education[a]	-.05	-.05	-.09**	-.12**	-.01
Driving MOS	.07*	.06	.03	.05	.02**
Air Defense	.03	-.01	.04	.02	.00
Adj. General/Admin.	-.03	-.03	-.03	-.03	-.01

Table A23 (continued)

Study 1: Correlations of Demographic Variables With Accident Involvement Criteria

	Accident Involvement Criteria				
Demographic Variable	Total Cost	Injuries	Fatalities	Severity	Had Accident
Armored	.04	.04	-.03	.03	.01**
Aviation	-.02	.00	-.04	.00	.00
Chemical	-.01	.01	-.01	.01	.00
Engineer	.04	-.01	-.01	.02	.00
Field Artillery	.04	.05	.05	.07*	.01
Infantry	.06	.12**	.05	.14**	-.01**
Medical	.01	-.01	.04	.05	.00
Military Intelligence	-.02	.00	-.01	.00	-.01
Military Police	-.09	-.04	-.10**	-.14**	.03**
Ordnance	-.03	.03	-.02	-.01	.00
Quartermaster	-.03	-.04	.00	-.02	.00
Signal Corps	-.02	.01	-.02	.01	-.01
Special Operations	-.02	.01	-.02	.00	.00
Transportation	.03	-.09**	.08**	-.05	.04**

Note. n = 734 for the first four dependent variables, and n = 59,126 to 60,571 for Had an Accident, unless otherwise noted.

[a]n = 667-674 for the first four dependent variables. [b]n = 701 for the first four dependent variables.

*$p < .10$. **$p < .05$.

Table A24

Study 1: Summary of Simultaneous Regression Analyses for ASVAB Scores Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
		Scale Scores			
General Science	87.77 (383.38)	.00 (.01)	.00 (.00)	.01 (.01)	.01 (.01)
Arithmetic Reasoning	-60.97 (368.08)	-.01 (.01)	.00 (.00)	.00 (.01)	-.02 (.01)**
Word Knowledge	3842.85 (3224.31)	.00 (.08)	.01 (.03)	.07 (.06)	.06 (.07)
Paragraph Comprehension	1712.76 (1399.46)	.01 (.03)	.00 (.01)	.03 (.03)	.02 (.03)
Numerical Operations	277.76 (351.44)	.00 (.01)	.00 (.00)	.00 (.01)	.01 (.01)
Coding Speed	-375.15 (322.19)	.00 (.01)	.00 (.00)	.00 (.01)	-.01 (.01)*
Auto/Shop Information	-132.81 (286.61)	.01 (.01)	.00 (.00)	.00 (.01)	.01 (.01)
Mathematics Knowledge	-211.41 (329.64)	.01 (.01)	.00 (.00)	.00 (.01)	.02 (.01)**
Mechanical Comprehension	43.27 (310.16)	.00 (.01)	.00 (.00)	.00 (.01)	.00 (.01)
Electronics Information	260.82 (312.26)	.01 (.01)	.00 (.00)	.00 (.01)	-.01 (.01)
Verbal	-5049.82 (4430.48)	-.01 (.10)	.01 (.04)	-.10 (.08)	-.10 (.10)
Model $\underline{R}^2$ / Model χ^2	.01	.01	.00	.01	28.01*
		Composite Scores			
General Technical	-1414.01 (1268.54)	.03 (.03)	-.01 (.01)	.08 (.05)	-.07 (.03)**
General Maintenance	-3031.86 (1788.75)*	.07 (.04)	-.02 (.01)	.11 (.06)**	-.03 (.04)
Electrical	1180.98 (1561.76)	-.03 (.04)	-.02 (.01)	.03 (.03)	.05 (.03)
Mechanical Maintenance	2185.70 (1785.07)	-.02 (.04)	.02 (.01)	-.06 (.03)	-.02 (.04)

Table A24 (continued)

Study 1: Summary of Simultaneous Regression Analyses for ASVAB Scores Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Signal Communication	-1926.37 (1692.79)	.02 (.04)	-.02 (.01)	-.04 (.02)	.01 (.04)
Combat	3871.01 (2895.86)	-.08 (.07)	.04 (.02)	.04 (.03)	.02 (.06)
Field Artillery	-4752.34 (3004.22)	.08 (.07)	-.04 (.02)*	-.03 (.04)	-.03 (.07)
Operators/Food Service	-1531.00 (1860.25)	.02 (.04)	-.02 (.02)	-.06 (.03)	.03 (.04)
Skilled/Technical	2190.18 (1631.64)	-.04 (.04)	.02 (.01)*	.05 (.03)	.00 (.04)
Model R^2/ Model χ^2	.01	.01	.00	.01	21.45*
AFQT and ASVAB Composites					
Speed	-139.37 (226.69)	.01 (.01)	.00 (.00)	.00 (.00)	.00 (.01)
Quantitative	-238.18 (416.50)	-.01 (.01)	.00 (.00)	.00 (.01)	.02 (.01)**
Technical	29.60 (134.71)	.01 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Verbal	13.78 (368.67)	.00 (.01)	.00 (.00)	.01 (.01)	.01 (.01)
AFQT 1980 Score	216.39 (375.89)	-.01 (.01)	.00 (.00)	.00 (.01)	-.01 (.01)
AFQT 1989 Score	8.59 (553.28)	.02 (.01)	.01 (.00)	.00 (.01)	-.01 (.01)
Model R^2/ Model χ^2	.00	.01	.00	.01	15.31**

Note. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; logistic regressions were conducted for Had an Accident. n=721 for the first four dependent variables. n=58,664-58,675 for Had an Accident.

*p<.10. **p < .05.

Table A25

Study 1: Summary of Simultaneous Regression Analyses for Spatial Aptitude Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Assembling Objects	522.47 (410.48)	.01 (.01)	.00 (.00)	-.01 (.01)	.01 (.01)
Map	-192.82 (519.81)	.00 (.01)	.00 (.00)	.01 (.01)	.00 (.01)
Maze	146.43 (573.81)	.01 (.01)	.01 (.00)	.01 (.01)	.00 (.01)
Object Rotation	-188.61 (130.32)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Orientation	-28.55 (435.64)	-.01 (.01)	.00 (.00)	.00 (.01)	-.01 (.01)
Figural Reasoning	-258.48 (521.98)	-.01 (.01)	.00 (.00)	-.01 (.01)	-.01 (.01)
Model R^2/ Model χ^2	.01	.01	.00	.01	3.50

Note. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; logistic regressions were conducted for Had an Accident. n=488 for the first four dependent variables. n=37,964 for Had an Accident.

*$p<.10$. **$p<.05$.

Table A26

Study 1: Summary of Simultaneous Regression Analyses for Perceptual and Psychomotor Aptitude Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
Simple Reaction Time										
Proportion Correct	-14890.50	(37664.56)	-.207	(.88)	-.5210	(.29)	-.2940	(.71)	-.152	(.82)
Median Decision Time	-11.74	(14.39)	.001	(.00)	.0001	(.00)	.0001	(.00)	.001	(.00)**
Median Movement Time	-50.80	(37.23)	.002	(.00)*	.0006	(.00)**	.0014	(.00)**	-.001	(.00)
Model $\underline{R}^2$/ Model χ^2		.01		.01		.02**		.01		3.95
Choice Reaction Time										
Proportion Correct	-64528.70	(51415.62)	-2.62	(1.19)**	-1.4400	(.40)**	-2.80	(.97)**	-1.47	(1.07)
Median Decision Time	-34.12	(23.18)	.00	(.00)	-.0003	(.00)*	.00	(.00)	.00	(.00)
Median Movement Time	-12.31	(41.35)	.00	(.00)	-.0005	(.00)*	.00	(.00)	.00	(.00)
Model $\underline{R}^2$/ Model χ^2		.01		.02*		.04**		.02**		3.16
Perceptual Speed/Accuracy										
Proportion Correct	9149.71	(27893.74)	.50	(.65)	.1870	(.22)	.13	(.53)	-1.60	(.59)**
Mean Decision Time	3.55	(23.84)	.00	(.00)	.0000	(.00)	.00	(.00)	.00	(.00)
Median Movement Time	6.40	(4.03)	.00	(.00)	.0003	(.00)*	.00	(.00)	.00	(.00)
Model $\underline{R}^2$/ Model χ^2		.01		.01		.01		.01		8.58**

Table A26 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Perceptual and Psychomotor Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
				Short Term Memory						
Proportion Correct	35982.06	(25118.63)	.21	(.59)	.20	(.20)	.67	(.48)	-.66	(.58)
Mean Decision Time	-5.85	(21.05)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Median Movement Time	13.46	(10.33)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Model R^2/Model χ^2		.01		.01		.00		.01		3.36
				Target Identification						
Proportion Correct	11959.11	(25124.21)	-.36	(.59)	.06	(.20)	-.25	(.48)	-.33	(.50)
Mean Decision Time	-17.92	(27.69)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Median Movement Time	4.05	(3.63)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Model R^2/Model χ^2		.01		.00		.01		.00		.53
				Number Memory Test						
Proportion Correct	2885.49	(23248.23)	-.52	(.54)	-.26300	(.18)	-.43	(.44)	-.52	(.47)
Mean Time to Make Initial Response	-4.42	(4.90)	.00	(.00)	-.00004	(.00)*	.00	(.00)	.00	(.00)
Mean Time to Make Final Response	-3.91	(5.49)	.00	(.00)	.00000	(.00)	.00	(.00)	.00	(.00)

Table A26 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Perceptual and Psychomotor Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
Mean Reaction Time: Arithmetic Operations	4.35	(3.87)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Model R^2/ Model χ^2		.01		.01		.01		.00		4.05
Other Psychomotor Tests										
Target Tracking: Control/Precision	8321.40	(7436.24)	.22	(.17)	.02	(.06)	.08	(.14)	-.051	(.16)
Target Multilimb Coordination	2.27	(6720.99)	-.09	(.16)	.00	(.05)	-.04	(.13)	.270	(.14)
Cannon Shoot Test	-47.74	(27.85)*	.00	(.00)	.00	(.00)	.00	(.00)	-.001	(.00)**
Target Shoot: Mean Accuracy	-2898.51	(10919.20)	-.25	(.25)	-.05	(.09)	-.18	(.21)	-.122	(.25)
Target Shoot: Mean Speed	-5.25	(4.66)	.00	(.00)	.00	(.00)	.00	(.00)	.000	(.00)
Model R^2/ Model χ^2		.01		.01		.00		.01		8.29

Note. Multiple regressions were performed for Total Cost, Number of Injuries, Number of Fatalities, and Severity; Logistic Regressions were conducted for Had an Accident. n=482-491 for the first four dependent variables. n=36,697-38,035 for Had an Accident.

*$p < .10$. **$p < .05$.

Table A27

Study 1: Summary of Simultaneous Regression Analyses for Psychomotor Composites Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Psychomotor	37.62 (82.89)	.00 (.00)	.00 (.00)	.01 (.00)**	.00 (.00)
Perceptual Speed	-279.35 (158.99)	.00 (.00)	.00 (.00)	-.01 (.00)	.00 (.00)
Perceptual Accuracy	49.58 (162.61)	.00 (.00)	.00 (.00)	.00 (.00)	-.01 (.00)**
Number Speed/Accuracy	33.85 (156.09)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Basic Speed	143.20 (91.20)	.00 (.00)	.00 (.00)	.00 (.00)	-.01 (.00)**
Basic Accuracy	-147.41 (124.08)	-.01 (.00)*	-.01 (.00)**	-.01 (.00)*	.00 (.00)
Short Term Memory	32.93 (143.95)	.00 (.00)	.00 (.00)	.00 (.00)	.01 (.00)*
Movement Time	88.51 (241.54)	.00 (.01)	.00 (.00)	.00 (.01)	.00 (.01)
Model R^2/ Model χ^2	.02	.02	.03	.03	12.04

Note. Multiple regressions were performed for Total Cost, Number of Injuries, Number of Fatalities, and Severity; Logistic Regressions were conducted for Had an Accident. n=473 for the first four dependent variables. n=36,756 for Had an Accident.

*p<.10. **p<.05.

Table A28

Study 1: Summary of Simultaneous Regression Analyses for ABLE Temperament Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	(SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
			Scales			
Dominance	180.87	(717.63)	.02 (.02)	.00 (.01)	.00 (.01)	.02 (.01)
Cooperativeness	270.18	(633.54)	-.02 (.02)	.00 (.01)	.00 (.01)	-.02 (.01)*
Nondelinquency	617.93	(613.01)	.01 (.01)	.00 (.01)	.01 (.01)	-.02 (.01)*
Traditional Values	-1633.16	(1125.84)	.00 (.03)	-.01 (.01)	-.02 (.02)	.04 (.02)*
Internal Control	-28.06	(689.70)	.00 (.02)	.00 (.01)	.00 (.01)	.01 (.01)
Conscientiousness	-754.28	(955.29)	-.04 (.02)*	-.01 (.01)	-.02 (.02)	.02 (.02)
Work Orientation	846.33	(633.20)	.03 (.02)*	.01 (.01)*	.03 (.01)**	-.02 (.01)
Emotional Stability	990.95	(729.27)	.01 (.02)	.01 (.01)	.03 (.01)**	.01 (.01)
Self Esteem	-278.09	(1018.44)	.00 (.02)	-.01 (.01)	-.03 (.02)	-.03 (.02)
Energy Level	-950.02	(770.05)	-.02 (.02)	-.01 (.01)	-.02 (.01)	.00 (.01)
Physical Condition	892.56	(933.07)	.00 (.02)	.01 (.01)	.00 (.02)	.01 (.02)
Social Desirability	-345.99	(821.33)	.02 (.02)	.00 (.01)	.01 (.02)	.03 (.02)
Self Knowledge	453.42	(826.21)	.00 (.02)	.00 (.01)	.02 (.02)	.02 (.02)
Non-Random Response	797.10	(1691.79)	-.01 (.04)	-.02 (.01)	-.04 (.03)	-.20 (.08)**
Poor Impression	-757.63	(1991.30)	-.01 (.05)	-.03 (.02)*	-.01 (.04)	-.09 (.04)**
Model $\underline{R}^2$/ Model χ^2		.03	.03	.04	.04	24.22*

Table A28 (continued)

Study 1: Summary of Simultaneous Regression Analyses for ABLE Temperament Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
			Composite Scores			
Achievement Orientation	-43.53	(172.55)	.00 (.00)	.00 (.00)	.00 (.00)	-.01 (.00)
Leadership	59.40	(317.29)	.01 (.01)	.00 (.00)	.00 (.01)	.01 (.01)
Adjustment	526.19	(349.64)	.01 (.01)	.01 (.00)**	.01 (.01)*	.01 (.01)
Cooperativeness	110.54	(313.60)	-.01 (.01)	.00 (.00)	.00 (.01)	-.01 (.01)*
Internal Control	74.20	(306.13)	.00 (.01)	.00 (.00)	.00 (.01)	.00 (.01)
Physical Condition	160.10	(273.28)	.00 (.01)	.00 (.00)	.00 (.01)	.00 (.01)
Dependability	-111.06	(144.18)	.00 (.00)	.00 (.00)	.00 (.00)	.00 (.00)
Model R^2/ Model χ^2		.01	.02	.02	.02	7.13

Note. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; logistic regressions were conducted for Had an Accident. n=445 for the first four dependent variables. n=34,624 for Had an Accident.

*p<.10. **p < .05.

Table A29

Study 1: Summary of Simultaneous Regression Analyses for ABLE Temperament Factors Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
			Factor Scores (168 items)							
Dominance	-6.07	(448.93)	.01	(.01)	.00	(.00)	-.01	(.01)	.00	(.01)
Cooperation	84.10	(693.80)	-.03	(.02)*	.00	(.01)	.00	(.01)	-.02	(.01)
Locus of Control	-510.64	(652.21)	.00	(.02)	.00	(.01)	-.01	(.01)	.01	(.01)
Dependability	87.91	(365.89)	-.01	(.01)	.00	(.00)	-.01	(.01)	.00	(.01)
Work Orientation	-21.98	(324.62)	.01	(.01)	.00	(.00)	.01	(.01)*	.00	(.01)
Stress Tolerance	397.58	(388.55)	.00	(.01)	.00	(.00)	.01	(.01)	.01	(.01)
Physical Condition	628.60	(789.26)	.00	(.02)	.00	(.01)	.00	(.02)	.00	(.02)
Model R^2/ Model χ^2		.01		.02		.01		.02		2.67
			Factor Scores (114 items)							
Dominance	-86.68	(474.75)	.01	(.01)	.00	(.00)	-.01	(.01)	.00	(.01)
Cooperation	-45.68	(932.03)	-.01	(.02)	.00	(.01)	.01	(.02)	-.02	(.02)
Cooperation	-45.68	(932.03)	-.01	(.02)	.00	(.01)	.01	(.02)	-.02	(.02)
Locus of Control	-782.18	(842.99)	.00	(.02)	.00	(.01)	-.02	(.02)	.02	(.02)
Dependability	52.11	(469.96)	-.01	(.01)	.00	(.00)	-.01	(.01)	.00	(.01)

Table A29 (continued)

Study 1: Summary of Simultaneous Regression Analyses for ABLE Temperament Factor Scores Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Work Orientation	177.04 (405.67)	.00 (.01)	.01 (.01)*	.01 (.01)	.00 (.01)
Stress Tolerance	813.24 (564.14)	.00 (.01)	.02 (.00)*	.01 (.01)	.01 (.01)
Physical Condition	553.11 (789.97)	.00 (.02)	.00 (.01)	.00 (.02)	.00 (.02)
Model R/ Model χ^2	.01	.01	.02	.02	3.26

Note. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; logistic regressions were conducted for Had an Accident. n=443 for the first four dependent variables. n=34,642 for Had an Accident.

*p<.10. **p < .05.

Table A30

Study 1: Summary of Simultaneous Regression Analyses for Job Values (JOB) Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
			Scale Scores			
Pride	242.23	(763.58)	.02 (.02)	.00 (.01)	.00 (.01)	.01 (.02)
Job Security/Comfort	953.71	(1264.79)	-.04 (.03)	.00 (.01)	-.01 (.02)	-.04 (.03)
Serving Others	-375.13	(1272.37)	-.02 (.03)	.01 (.01)	.03 (.02)	.01 (.03)
Job Autonomy	1272.64	(944.23)	.03 (.02)	.00 (.01)	.02 (.02)	-.01 (.02)
Routine	-1117.00	(816.40)	.00 (.02)	-.01 (.01)	-.02 (.02)	.01 (.02)
Ambition	-60.28	(1172.95)	.03 (.03)	.01 (.01)	.01 (.02)	.03 (.03)
Model R^2/ Model χ^2		.01	.01	.01	.01	3.87
			Composite Scores			
High Expectations	78.92	(75.60)	.00 (.00)	.00 (.00)	.001 (.00)*	.00 (.00)
Routine	-292.08	(228.76)	.00 (.01)	.00 (.00)	-.002 (.00)	.00 (.00)
Autonomy	322.14	(234.93)	.01 (.01)	.00 (.00)	.001 (.00)	.00 (.01)
Model R^2/ Model χ^2		.01	.00	.01	.01	.98

Note. Multiple regressions were performed for Total Cost, Injuries, Fatalities, and Severity; Logistic regressions were performed for Had an Accident. n=485 for the first four dependent variables with JOB scales and 455 with JOB composites. n=37,502 for Had an Accident with JOB scales and 35,804 with JOB composites.

*p<.10. **p < .05.

Table A31

Study 1: Summary of Simultaneous Regression Analyses for Occupational Interest (AVOICE) Scales Predicting Accident Involvement Criteria

Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
			Scale Scores		
Rugged Individualism	536.65 (325.49)	.00 (.01)	.00 (.00)	.01 (.01)*	-.01 (.01)*
Leadership/Guidance	436.63 (332.17)	.00 (.01)	.01 (.00)*	.01 (.01)*	.00 (.01)
Law Enforcement	-382.30 (395.55)	.00 (.01)	.00 (.00)	-.01 (.01)	.02 (.01)*
Firearms Enthusiast	-87.66 (601.38)	.02 (.01)	.00 (.01)	.00 (.01)	.02 (.01)
Aesthetics	-677.89 (607.14)	-.02 (.01)	.01 (.01)	-.01 (.01)	-.03 (.01)**
Fire Protection	32.86 (666.64)	-.01 (.01)	.00 (.01)	.00 (.01)	.00 (.01)
Vehicle Operator	71.29 (530.29)	-.01 (.01)	.00 (.00)	.00 (.01)	.00 (.01)
Unlikely Response	-1902.96 (1312.26)	-.01 (.03)	.00 (.01)	-.02 (.03)	.01 (.03)
Model R^2/ Model χ^2	.03	.02	.02	.04**	12.04**

Table A31 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Occupational Interest (AVOICE) Scales Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	(SE B)	Injuries B	(SE B)	Fatalities B	(SE B)	Severity B	(SE B)	Had Accident B	(SE B)
					Composite Scores					
Rugged/Outdoors	186.70	(117.02)	.01	(.00)**	.01	(.00)*	.01	(.00)**	.00	(.00)
Audiovisual Arts	237.27	(130.01)*	.00	(.00)	.00	(.00)	.00	(.00)	-.01	(.00)*
Social	-48.51	(185.77)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Skilled Technical	10.85	(110.34)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Administrative	-139.18	(201.51)	.00	(.01)	.00	(.00)	-.01	(.00)	.00	(.00)
Food Services	-127.08	(148.71)	.00	(.00)	.00	(.00)	.00	(.00)	-.01	(.00)*
Protective Services	-112.53	(163.07)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Structural/Machines	89.62	(101.40)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)
Model R^2/ Model χ^2		.03*	.02		.03		.05**		14.36	

Note. Multiple regressions were performed for Total Cost, Injuries, Fatalities, and Severity; logistic regressions were performed for Had an Accident. n=479 for AVOICE scales and 465 for AVOICE composites with the first four dependent variables. n=37,172 for AVOICE scales and 36,098 for AVOICE composites with Had an Accident.

*p<.10. **p < .05.

Table A32

Study 1: Summary of Simultaneous Regression Analyses for End-of-Training Tests and Performance Ratings Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
School Knowledge Tests					
Total Knowledge Score	-941.86 (713.20)	.01 (.02)	.01 (.01)*	.03 (.01)**	-.08 (.02)**
Technical Knowledge Score	-468.98 (488.81)	.00 (.01)	-.01 (.00)*	-.02 (.01)**	.05 (.01)**
Basic Knowledge Score	-344.20 (272.02)	.00 (.01)	.00 (.00)	.00 (.01)	.02 (.01)**
Model $\underline{R}^2$/ Model χ^2	.01	.00	.01	.00	25.64**
Performance Ratings					
Technical Skill	-1323.35 (3281.16)	.10 (.08)	.00 (.03)	.01 (.06)	-.08 (.08)
Effort	4187.25 (3207.16)	-.09 (.08)	.01 (.03)	.05 (.06)	-.01 (.07)
Following Reg./Orders	-5843.99 (2694.43)**	-.01 (.07)	-.04 (.02)**	-.09 (.05)	-.19 (.06)**
Military Appearance	268.21 (3042.86)	-.09 (.07)	-.03 (.02)	-.10 (.06)*	.09 (.06)

Table A32 (continued)

Study 1: Summary of Simultaneous Regression Analyses for End-of-Training Tests and Performance Ratings Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Physical Fitness	629.77 (2268.82)	-.04 (.06)	.00 (.02)	-.01 (.04)	.16 (.05)**
Self Control	1756.09 (2149.10)	-.03 .05	.00 (.02)	-.03 (.04)	-.04 (.05)
Leadership Potential	66.24 (2583.88)	.10 (.06)	.02 (.02)	.10 (.05)**	.04 (.06)
Model R^2/ Model χ^2	.01	.01	.01	.02	38.06**

Note. Multiple regressions were performed for Total Cost, Injuries, Fatalities, and Severity; a logistic regression was performed for Had an Accident. n=431 for tests and 601 for ratings with the first four dependent variables. n=31,260 for tests and 43,751 for ratings with Had an Accident.

*p<.10. **p < .05.

Table A33

Study 1: Summary of Simultaneous Regression Analyses for Driving Behaviors and History Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Enlistment Waivers					
Minor Non-Traffic Related	-12112.50 (19247.36)	-.38 (.45)	-.12 (.15)	-.27 (.37)	.31 (.41)
Minor Traffic Related	-14160.30 (33238.92)	.62 (.78)	-.12 (.26)	.06 (.63)	.92 (.72)
Misdemeanor Conviction	12781.27 (7465.46)*	.17 (.17)	.09 (.06)	.33 (.14)**	.09 (.16)
Felony Conviction	37530.21 (33216.10)	-.38 (.78)	-.12 (.26)	.06 (.63)	1.60 (.73)**
Other Offense	-3645.61 (14767.22)	-.28 (.35)	-.12 (.12)	-.14 (.28)	.55 (.34)
Model $\underline{R}^2$/ Model χ^2	.01	.00	.01	.01	7.30
Accident Errors in Accident Record					
Speeding	18886.49 (33295.32)	-.35 (.78)	-.09 (.26)	-.38 (.63)	--
Reckless Driving	6743.93 (3910.42)*	.04 (.09)	.03 (.03)	.08 (.07)	--
Poor Judgment	-482.75 (4028.41)	-.03 (.09)	-.01 (.03)	-.04 (.08)	--
Improper Equipment Use	-376.89 (9445.80)	-.19 (.22)	-.01 (.07)	-.28 (.18)	--
Poor Planning	-6243.40 (11638.90)	.09 (.27)	-.09 (.09)	-.01 (.22)	--
Fatigue/Inattention	5616.55 (3862.27)	-.05 (.09)	.05 (.03)*	.08 (.07)	--

Table A33 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Driving Behaviors and History Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Poor Driving Skill	-7048.76 (4654.45)	-.12 (.11)	-.03 (.04)	-.10 (.09)	--
Model R^2	.01	.00	.01	.01	

Note. Dashes indicate not applicable because these data exist only for those who had an accident. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; a logistic regression was conducted for Had an Accident. Reference category for Enlistment Waiver was No Need for a Waiver. Reference category for Accident Error was No Accident Error. n=733 for the first four dependent variables, n=60,560 for Had an Accident.

*p<.10. **p < .05.

Table A34

Study 1: Summary of Simultaneous Regression Analyses for Transient Factors Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)
	Time, Location, and Related Variables[a]			
Year of Accident	2055.89 (842.89)**	.01 (.02)	.00 (.01)	.00 (.01)
Weekend Hour	14652.22 (5419.31)**	.20 (.12)	.03 (.04)	.19 (.08)**
Daylight	2621.92 (4515.77)	.01 (.10)	-.05 (.03)	.01 (.07)
Outside Continental U.S.	-6064.71 (11060.07)	-.02 (.25)	-.02 (.08)	-.15 (.17)
Fatality Rate in State	288.54 (457.75)	-.02 (.01)	.00 (.00)	.01 (.01)
On Post	2295.34 (5545.96)	.15 (.12)	-.06 (.04)	-.07 (.09)
On Duty	-21754.60 (11468.37)*	-.15 (.26)	-.10 (.09)	-.27 (.18)
During Field Training	-7295.42 (12168.13)	-.99 (.27)**	.01 (.09)	.13 (.19)
During Tactical Training	16677.75 (12016.16)	1.66 (.27)**	-.01 (.09)	.24 (.18)
Environmental/Weather Prob.	383.58 (4633.90)	-.25 (.10)**	-.08 (.04)**	-.16 (.07)**
Road Speed	6109.49 (5466.98)	.27 (.12)**	.04 (.04)	.26 (.08)**
Vehicle Size	4836.74 (2708.87)*	.03 (.06)	.06 (.02)**	.13 (.04)**
Privately Owned Vehicle	10653.02 (11257.75)	.73 (.25)**	.13 (.09)	.88 (.17)**
Model R^2	.09**	.18**	.12**	.36**

Table A34 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Transient Factors Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)
		Transient Personal Factors		
Age at Time of Accident	157.64 (365.91)	-.01 (.01)	-.01 (.00)*	-.01 (.01)
Alcohol Use	28464.68 (6806.59)**	.55 (.16)**	.16 (.05)**	.60 (.13)**
Using Seatbelt/Protective Equipment	-8451.73 (3535.61)**	-.23 (.08)**	-.07 (.03)**	-.29 (.07)**
Model R^2	.04**	.04**	.03**	.07**
		Type of Roadway[b]		
Highway	20309.54 (22291.06)	-.38 (.52)	.17 (.17)	.32 (.42)
Street	15251.06 (7916.60)*	.13 (.18)	.12 (.06)*	.32 (.15)**
Off Road	-485.32 (11031.21)	.22 (.26)	.00 (.09)	.24 (.21)
Building/Parking Lot	3745.22 (11031.21)	-.47 (.26)*	-.03 (.09)	-.22 (.21)
Model R^2	.01*	.02**	.02**	.02**

Table A34 (continued)

Study 1: Summary of Simultaneous Regression Analyses for Transient Factors Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)
		Vehicle Type[c]		
Motorcycle	17337.61 (9211.56)*	.53 (.21)**	.00 (.07)	.72 (.17)**
Automobile	22256.03 (9291.74)**	.52 (.19)**	.13 (.06)**	.74 (.15)**
Small Truck	15308.04 (9003.49)*	.51 (.21)**	.02 (.07)	.47 (.16)**
Jeep/Humvee	8213.33 (9673.14)	.24 (.22)	-.05 (.08)	.08 (.18)
Van	11633.99 (10696.47)	.10 (.25)	-.03 (.08)	.00 (.19)
Large Truck	4560.39 (9196.52)	-.06 (.21)	.01 (.07)	.13 (.17)
Bus	-1143.39 (22221.36)	-.13 (.51)	.12 (.17)	.30 (.40)
Fighting Vehicle	3479.37 (10055.89)	.25 (.23)	-.03 (.08)	.24 (.18)
Model R^2	.03**	.04**	.04**	.11**

Note. n=733 accidents unless otherwise noted.

[a]n=510. [b]Reference category is Country Road. [c]Reference category is Other Army Vehicle.

*p<.10. **p < .05

Table A35

Study 1: Summary of Simultaneous Regression Analyses for Demographic Variables Predicting Accident Involvement

Predictor Variable	Total Cost B (SE B)	Injuries B (SE B)	Fatalities B (SE B)	Severity B (SE B)	Had Accident B (SE B)
Years of Education	-2594.68 (2410.53)	-.04 (.06)	-.04 (.02)**	-.12 (.05)**	-.07 (.05)
Height	-1248.49 (698.42)*	-.01 (.02)	-.01 (.01)**	-.01 (.01)	.00 (.01)
Hearing Limitation	-9956.02 (11504.93)	-.15 (.27)	-.06 (.09)	-.26 (.22)	.19 (.21)
Eyesight Limitation	3880.54 (4432.54)	-.03 (.10)	.03 (.04)	.07 (.08)	-.06 (.09)
Physical Limitation	-10033.20 (11429.54)	-.29 (.27)	-.07 (.09)	-.24 (.22)	.13 (.24)
Number of Dependents	-3309.08 (1842.73)*	.02 (.04)	-.02 (.02)	-.02 (.04)	--[a]
Gender	-15066.30 (7501.40)**	-.18 (.18)	-.08 (.06)	-.18 (.14)	-.06 (.16)
Single[b]	2753.60 (8513.68)	.07 (.20)	.03 (.07)	.08 (.16)	.22 (.13)
Divorced[b]	70135.09 (17387.95)**	-.04 (.41)	.05 (.14)	.16 (.33)	.49 (.31)
Any Enlistment Waiver	8400.54 (6636.19)	.06 (.16)	.04 (.05)	.21 (.13)*	.26 (.14)*
Driving MOS	5537.75 (3791.91)	.09 (.09)	.02 (.03)	.06 (.07)	.75 (.08)**
Black[c]	-1216.38 (4194.92)	-.20 (.10)**	-.03 (.03)	-.20 (.08)	.30 (.09)**
Other Race/Ethnicity[c]	-5376.51 (7565.39)	-.06 (.18)	.04 (.06)	-.04 (.14)	.31 (.16)**
Model R^2/Model χ^2	.05**	.02	.03	.04**	118.13**

Note. Dashes indicate variable not included due to missing data. Regressions were conducted for the first four dependent variables; logistic regression was conducted for Had an Accident. n=692 for the first four dependent variables. n=59,113 for Had an Accident.

[a]Number of Dependents could not be included because it was constant for all cases in the equation. [b]Married was used as a reference category for marital status. [c]White was used as the reference category for racial/ethnic groups.

*$p<.10$. **$p<.05$

Table A36

Study 1: Summary of Simultaneous Regression Analyses for Rank Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	(SE B)	Injuries B	(SE B)	Fatalities B	(SE B)	Severity B	(SE B)	Had Accident B	(SE B)
E1	-8139.00	(10407.49)	.13	(.24)	.05	(.08)	.21	(.20)	.72	(.18)**
E2	-5659.13	(5163.01)	.09	(.12)	.01	(.04)	.02	(.10)	.96	(.18)**
E3	-5736.81	(4314.02)	.01	(.10)	.00	(.03)	.02	(.08)	.87	(.19)**
E5	-3380.62	(6021.08)	-.20	(.14)	-.06	(.05)	-.12	(.11)	1.61	(.74)**
E6	-14172.80	(9472.50)	.20	(.22)	-.13	(.07)*	-.49	(.18)**	-1.99	(12.22)
E7	-16717.50	(23664.16)	-.37	(.55)	-.13	(.19)	-.22	(.45)	-1.99	(25.92)
Model R^2/Model χ^2	.01		.01		.01		.02		41.98**	

Note. Multiple regressions were conducted for Total Cost, Injuries, Fatalities, and Severity; logistic regression was conducted for Had an Accident. E4 rank was used as a reference category. n=733 for the first four dependent variables. n=60,560 for Had an Accident.

*p<.10. **p < .05.

Table A37

Study 1: Summary of Simultaneous Regression Analyses for MOS Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
Air Defense	20507.75	(15298.26)	.30	(.35)	.20	(.12)*	.64	(.29)**	1.02	(.35)**
Adj. General/Admin	1669.39	(13675.09)	.20	(.32)	.03	(.11)	.34	(.26)**	1.49	(.28)*
Armored	19821.85	(11074.88)*	.58	(.26)**	.05	(.09)	.64	(.21)**	1.33	(.21)**
Aviation	963.93	(18435.05)	.40	(.43)	-.03	(.14)	.43	(.34)	1.12	(.41)**
Chemical	8350.06	(16876.83)	.53	(.39)	.07	(.13)	.56	(.31)*	1.93	(.32)**
Engineer	19652.86	(11296.79)*	.36	(.26)	.08	(.09)	.59	(.21)**	1.90	(.24)**
Field Artillery	17414.24	(9903.59)*	.58	(.23)**	.15	(.08)**	.70	(.18)**	1.16	(.18)**
Infantry	16908.57	(8951.24)*	.68	(.21)**	.13	(.07)*	.76	(.17)**	1.75	(.16)**
Medical	12910.04	(10165.95)	.39	(.24)	.15	(.08)*	.66	(.19)**	1.74	(.20)**
Military Intelligence	-10102.90	(47599.09)	.53	(1.10)	-.03	(.37)	.56	(.89)	-2.87	(3.40)
Military Police	940.35	(9350.06)	.30	(.22)	.00	(.07)	.20	(.17)	1.72	(.17)**
Ordnance	6285.15	(10308.28)	.53	(.24)**	.06	(.08)	.46	(.19)**	1.28	(.30)**
Quartermaster	6910.90	(9830.12)	.27	(.23)	.10	(.08)	.46	(.18)**	.76	(.19)**
Signal Corps	4870.99	(14897.77)	.46	(.35)	.04	(.12)	.56	(.28)**	.41	(.31)

Table A37 (continued)

Study 1: Summary of Simultaneous Regression Analyses for MOS Predicting Accident Involvement Criteria

Predictor Variable	Total Cost B	Total Cost (SE B)	Injuries B	Injuries (SE B)	Fatalities B	Fatalities (SE B)	Severity B	Severity (SE B)	Had Accident B	Had Accident (SE B)
Special Operations	-10452.90	(34135.08)	.53	(.79)	-.03	(.27)	.56	(.64)	-2.87	(18.22)
Transportation	15044.40	(9679.53)	.14	(.22)	.18	(.08)**	.39	(.18)**	1.73	(.17)**
Model R^2/ Model χ^2	.02		.03*		.03		.06**		93.71**	

Note. Multiple regressions were performed for Total Cost, Injuries, Fatalities, and Severity; logistic regression was performed for Had an Accident. Reference category for MOS is Training and Miscellaneous. n=733 for MOS with the first four dependent variables. n=60,560 with Had an Accident.

*$p<.10$. **$p<.05$.

Table A38

Study 1: Summary of Final Hierarchical Regression Analysis for Predicting Total Cost of Accidents

Variable	B	SE B	β
Step 1			
Perceptual Speed Composite	-279.23	123.58	-.11**
AVOICE Composite: Rugged/Outdoors	251.04	83.43	.14**
Step 1 R^2	.03**		
Step 2			
Perceptual Speed Composite	-287.30	122.12	-.11**
AVOICE Composite: Rugged/Outdoors	226.60	82.56	.13**
Marital Status at Accession[a]			
Married	-12195.80	7547.74	-.07*
Divorced	35475.69	16195.17	.10**
Weekend Night Hour	11606.73	5909.82	.09*
Vehicle Size	-4434.20	1948.81	-.11**
Step 2 R^2	.07**		
Step 2 ΔR^2	.04**		

Note. $n = 462$.

[a]The reference category for marital status is Single.

*$p < .10$. **$p < .05$.

Table A39

Study 1: Summary of Final Hierarchical Regression Analysis for Predicting Number of Injuries

Variable	B	SE B	β
Step 1			
Choice Reaction: Proportion Correct	-2.63	1.18	-.10**
AVOICE Composite: Rugged/Outdoors	.01	.00	.12**
Step 1 R^2	.03**		
Step 2			
Choice Reaction: Proportion Correct	-2.44	1.16	-.10**
AVOICE Composite: Rugged/Outdoors	.00[a]	.00	.09*
Daylight	-.26	.11	-.11**
Vehicle Size	-.12	.05	-.12**
Environmental/Weather Problem	-.29	.10	-.13**
Step 2 R^2	.07**		
Step 2 ΔR^2	.05**		

Note. $n = 465$.

[a]Value is .004.

*$p < .10$. **$p < .05$.

Table A40

Study 1: Summary of Final Hierarchical Regression Analysis for Predicting Number of Fatalities

Variable	B	SE B	β
Step 1			
Choice Reaction: Proportion Correct	-1.2310	.4120	-.14**
Perceptual Speed: Median Movement Time	.0005	.0000	.13**
Simple Reaction: Median Movement Time	-.0007	.0000	-.11**
AVOICE Composite: Rugged/Outdoors	.0014	.0010	.10**
ABLE Factor Score: Stress Tolerance	.0077	.0030	.11**
Step 1 R^2	.07**		
Step 2			
Choice Reaction: Proportion Correct	-1.2240	.4060	-.14**
Perceptual Speed: Movement Time	.0004	.0000	.12**
Simple Reaction: Median Movement Time	-.0006	.0000	-.10**
AVOICE Composite: Rugged/Outdoors	.0011	.0010	.08*
ABLE Factor Score: Stress Tolerance	.0082	.0030	.11**
Daylight	-.1150	.0360	-.15**
Environmental/Weather Problem	-.0858	.0360	-.11**
Step 2 R^2	.10**		
Step 2 ΔR^2	.03**		

Note. $n = 424$.

*$p < .10$. **$p < .05$.

Table A41

Study 1: Summary of Final Hierarchical Regression Analysis for Predicting Accident Severity

Variable	B	SE B	β
Step 1			
Choice Reaction: Proportion Correct	-2.760	.993	-.13**
Perceptual Speed: Median Movement Time	.001	.000	.10**
AVOICE Composite: Rugged/Outdoors	.006	.002	.18**
ABLE Factor Score: Stress Tolerance	.012	.008	.07
Step 1 R^2	.07**		
Step 2			
Choice Reaction: Proportion Correct	-2.541	.941	-.12**
Perceptual Speed: Median Movement Time	.001	.000	.10**
AVOICE Composite: Rugged/Outdoors	.004	.002	.13**
ABLE Factor Score: Stress Tolerance	.014	.008	.08*
Years of Education	-.101	.050	-.09**
Daylight	-.258	.089	-.14**
Weekend Night Hour	.242	.113	.10**
Vehicle Size	-.155	.038	-.20**
Environmental/Weather Problem	-.177	.084	-.10**
Step 2 R^2	.18**		
Step 2 ΔR^2	.11**		

Note. $n = 424$.

*$p < .10$. **$p < .05$.

Table A42

Study 1: Summary of Final Logistic Regression Model for Predicting Had/Did Not Have an Accident

Variable	B	(SE B)	$r_{partial}$	e^B
Perceptual Speed: Proportion Correct	-.01	(.01)*	-.02	.99
End of Training: Follow Regulations/Orders	-.22	(.05)*	-.07	.80
End of Training: Physical Fitness	.14	(.05)*	.04	1.15

Note. n = 26,556. Perceptual Speed: Proportion Correct has been multiplied by 100 so that the B and e^B represent the change per a 1 percent change on the Perceptual Speed test.

*$p < .10$. **$p < .05$.

Table A43

Study 1: Summary of Final Event History Analysis for Predicting Had/Did Not Have an Accident

Variable	B (SE B)	$r_{partial}$	e^B
Marital Status at Accession[a]			
Single	1.1475 (.4471)**	.03	3.15
Married	.2836 (.2389)	.00	1.33
Age (When Person First Entered Database)	-.0001 (.0001)**	-.03	1.00
AVOICE Scale: Aesthetics	-.0404 (.0150)**	-.03	.96
AVOICE Scale: Law Enforcement	.0187 (.0088)**	.02	1.02
End of Training: Follow Regulations/Orders	-.2877 (.0627)**	-.06	.75
End of Training: Physical Fitness	.2115 (.0822)**	.03	1.24

Note. $n = 20{,}100$.

[a]Divorced was used as a reference group for the variable Marital Status.

*$p < .10$. **$p < .05$.

APPENDIX B

Table B1

Study 2: Descriptive Statistics for Dependent Variables

Variable	M	SD	n
	Seriousness of Accidents (Accidents as Cases)		
Total Cost	10959.98	29010.95	301
Injury or Fatality in Vehicle	.34	.47	305
Work Days Lost	3.84	22.61	305
Severity	1.20	.93	307
	Number of Accidents (Individuals as Cases)		
Self-Report Accidents	.52	.82	551
Safety Center Accidents	.23	.43	551
Total Accidents	.63	.87	551
Total At-Fault Accidents[a]	.31	.65	545

[a]Combination of Self-Report and Safety Center accidents with no duplication if same accident was in both self reports and USASC reports.

Table B2

Study 2: Descriptive Statistics for General Aptitude (ASVAB) Scores

Aptitude Test	All Accidents as Cases M	All Accidents as Cases SD	All Individuals as Cases M	All Individuals as Cases SD
	Standardized ASVAB Subtest Scores			
General Science	50.90	11.42	48.44	14.77
Arithmetic Reasoning	52.47	10.90	49.20	14.82
Word Knowledge	50.84	10.44	48.92	14.20
Paragraph Comprehension	51.05	10.77	49.28	14.46
Numerical Operations	52.74	10.92	50.40	14.95
Coding Speed	51.30	10.92	49.65	14.82
Auto/Shop Information	51.32	12.16	47.66	15.38
Mathematics Knowledge	52.58	11.14	49.71	14.98
Mechanical Comprehension	52.94	12.10	49.41	15.46
Electronics Information	50.44	11.28	47.82	14.89
Verbal	50.93	10.29	49.04	14.11
	Area Composite Scores			
General Technical	103.31	21.68	97.40	28.89
General Maintenance	104.15	21.52	98.91	29.11
Electrical	104.53	22.06	98.01	29.40
Clerical	104.28	21.29	97.73	28.92
Mechanical Maintenance	104.53	21.45	98.89	29.17
Signal Communication	104.88	21.64	99.44	29.23
Combat	104.10	21.30	98.94	28.91
Field Artillery	104.39	21.12	98.00	28.90
Operators/Food Service	105.06	21.16	99.68	28.92
Skilled/Technical	105.22	21.73	98.77	29.05
AFQT	58.34	19.98	56.78	19.80

Note. n = 307 accidents for All Accidents, and n =547 for All Individuals as Cases.

Table B3

Study 2: Descriptive Statistics for Spatial Aptitude Test Scores

Aptitude Test	All Accidents as Cases M	All Accidents as Cases SD	All Individuals as Cases M	All Individuals as Cases SD
Map	10.68	5.53	10.29	5.76
Maze	18.63	4.52	18.05	4.62
Object Rotation	36.79	7.54	35.32	7.87
Orientation	12.90	6.35	12.56	6.33
Figural Reasoning	21.25	4.36	20.60[a]	4.81

Note. n =307 accidents for All Accidents as Cases, and n = 549 for All Individuals as Cases.
[a]n = 548 individuals.

Table B4

Study 2: Descriptive Statistics for Waypoint Test Scores

	All Accidents as Cases			All Individuals as Cases		
Aptitude Test	M	SD	n	M	SD	n
Channel Capacity Score	7.12	2.23	298	7.13	2.32	539
Channel Capacity (Norm Group)	5.30	1.66	298	5.32	1.70	539
Waypoint Risk Group	1.23	.42	309	1.22	.41	549

Table B5

Study 2: Descriptive Statistics for Temperament Scores

Temperament Variable	All Accidents as Cases			All Individuals as Cases		
	M	SD	n	M	SD	n
			Type A Scales			
Impatience	3.39	.75	306	3.35	.75	547
Competitiveness	3.59	1.03	306	3.67	.97	546
Irritability	2.71	1.26	305	2.72	1.26	545
Polyphasic Behavior	3.09	.92	291	3.13	.87	531
Type A Total Scale	3.31	.61	290	3.32	.57	530
			AIM Scales			
Agreeableness	16.64	3.93	285	16.77	3.80	513
Dependability	22.58	4.91	287	23.07	4.73	514
Dominance	16.53	3.74	284	16.43	3.64	506
Adjustment	21.16	4.87	287	20.86	4.82	519
Work Orientation	22.39	4.15	289	22.25	4.19	521
Physical Condition	10.11	2.41	287	10.07	2.49	518
Adaptability	56.60	10.09	280	56.74	10.20	496
Social Desirability	.94	1.18	271	.99	1.16	483
			Driving-Related Locus of Control Scales			
Internal	2.76	.58	307	2.82	.59	548
External	2.78	.58	307	2.78	.62	548
			Impulsivity Scales			
Restless	2.93	1.00	305	2.87	.96	547
Risk Taker	2.87	1.15	306	2.84	1.13	548
Lively	3.64	.83	306	3.66	.82	548

Table B5 (continued)

Study 2: Descriptive Statistics for Temperament Scores

	All Accidents as Cases			All Individuals as Cases		
Temperament Variable	M	SD	n	M	SD	n
Impulsive	2.80	.64	304	2.76	.63	545
Impulsivity Total Scale	3.00	.53	305	2.96	.53	547

Table B6

Study 2: Descriptive Statistics for Driving Judgment, Behavior, Attitude, and History Variables

Measure	All Accidents as Cases M	SD	n	All Individuals as Cases M	SD	n
Speed Reduction and Accident Cause Judgment Scales						
Raw Score: Speed Judgments	4.94	1.97	245	4.79	1.92	403
Raw Score: Cause Judgments	4.62	1.28	244	4.60	1.28	402
Transformed Speed Score	.62	.20	245	.63	.22	401
Transformed Cause Score	.67	.16	244	.67	.17	400
Driving Behaviors (Self)						
Drive Too Fast	2.71	.90	308	2.71	.92	548
Forgetful Driver	1.82	.62	307	1.80	.65	548
Drive to Feel Power/Speed	1.88	1.14	308	1.92	1.12	547
Drink and Drive	1.60	.96	308	1.69	.99	546
Drive when Angry	2.08	1.06	308	2.06	1.07	549
Drive when Upset	2.50	1.49	309	2.52	1.44	548
Drive when Sleepy	2.44	1.08	307	2.40	1.12	549
Risky Driver	1.61	.68	309	1.64	.70	549
Drive Cautiously	2.22	1.18	309	2.27	1.23	549
Drive in Bad Weather Rather Than Miss a Social Event	2.60	1.45	306	2.63	1.50	540
Confidence in Driving Ability	4.37	.67	307	4.42	.66	546
Driving History						
Number of Warnings	2.64	3.39	309	2.56	4.29	551
Number of Tickets	3.85	4.38	307	2.73	3.27	548
Suspended License	.16	.36	309	.16	.37	550
License Revoked	.03	.17	309	.03	.18	550

Table B6 (continued)

Study 2: Descriptive Statistics for Driving Judgment, Behavior, Attitude, and History Variables

Measure	All Accidents as Cases M	SD	n	All Individuals as Cases M	SD	n
Scales on Beliefs about Army Discipline						
Expect Strong Punishment	3.42	1.15	308	3.54	1.14	550
Offenses Forgotten Quickly	2.34	1.04	301	2.38	1.06	540
Punishment is Lax	3.57	.90	298	3.61	.90	535
Punishment is Appropriate	2.97	1.08	296	3.03	1.07	530
Expect Serious Punishment For Military Vehicle Wreck	3.04	1.23	286	3.09	1.25	521
Scales on Beliefs about Severity of Driving Laws						
Drinking and Driving Punishments Are too Severe	1.55	.91	305	1.62	.97	547
Government Should not Mandate Helmets, Air Bags, Seatbelts, etc.	2.41	1.32	305	2.42	1.37	547
Total Scale on Driving Law Severity	2.78	.79	307	2.80	.82	549
Driving Anger Scales						
Police Monitoring	1.90	.85	307	1.94	.89	549
Drivers' Rude Gestures	2.49	1.17	307	2.46	1.07	549
Drivers with High Beams	3.27	1.10	307	3.33	1.06	547
Slow Drivers Blocking Traffic	2.65	.72	306	2.66	.71	547
Large Trucks	2.66	.94	307	2.66	.90	548
Drivers Cut You Off	3.29	.83	307	3.30	.82	549
High Speed Drivers	2.43	.62	307	2.45	.62	549
Total Driving Anger Scale	2.69	.70	307	2.70	.66	549

Table B6 (continued)

Study 2: Descriptive Statistics for Driving Judgment, Behavior, Attitude, and History Variables

Measure	All Accidents as Cases M	SD	n	All Individuals as Cases M	SD	n
	Driving Behaviors (Others)					
Drive Too Fast	3.94	1.16	307	3.90	1.15	544
Forgetful Driver	3.28	1.04	304	3.24	1.07	542
Drive to Feel Power/Speed	3.56	1.12	305	3.55	1.21	544
Drink and Drive	3.79	1.35	308	3.72	1.41	547
Drive when Angry	3.57	1.25	305	3.56	1.23	544
Drive when Upset	3.64	1.32	307	3.65	1.41	542
Drive when Sleepy	3.71	1.12	308	3.66	1.21	548
Risky Driver	3.22	1.11	306	3.15	1.09	539
Drive Cautiously	3.53	1.28	305	3.66	1.37	540
Drive in Bad Weather Rather Than Miss a Social Event	3.52	1.29	302	3.49	1.33	540

Table B7

Study 2: Descriptive Statistics for Transient Situational Factors

Factor	M	SD	n
Time, Location, and Other Conditions at Time of Accident			
Year of Accident	1995	1.34	121
Weekend Night Hour	.10	.30	309
Daylight	.77	.42	309
On Post	.28	.45	307
On Duty	.47	.50	309
Environmental/Weather Problem	.42	.49	293
Using Seatbelt	.81	.39	304
Familiarity with the Road	.31	.60	252
Road Condition	.36	.48	251
Vehicle Condition	.03	.18	307
Number of Passengers	.62	1.04	247
Passengers Bothering Driver	.03	.16	233
Driving Conditions and Driver Speed			
Amount of Traffic	1.35	.99	251
Speed of Traffic	1.36	.98	251
Driver Speed vs. Others	1.92	1.24	249
Driver Speed vs. the Limit	1.63	.73	245
Type of Roadway			
Road Speed	1.96	.46	299
Highway Accident	.08	.28	309
Street Accident	.65	.48	309
Country Road Accident	.11	.31	309
Off-Road Accident	.03	.17	309
Parking Lot/Building Accident	.09	.29	309

Table B7 (continued)

Study 2: Descriptive Statistics for Transient Situational Factors

Factor	M	SD	n
	Season of the Accident[a]		
Spring	.14	.35	188
Summer	.24	.43	188
Autumn	.10	.30	188
Winter	.13	.34	188
	Vehicle Type		
Vehicle Size	2.41	.77	304
Motorcycle	.05	.22	309
Automobile	.54	.50	309
Small Truck	.18	.38	309
Jeep/Humvee	.07	.26	309
Van	.04	.19	309
Large Truck	.07	.26	309
Bus	.02	.00	309
Fighting Vehicle	.07	.08	309
Other Army Vehicle	.01	.15	309
Privately Owned Vehicle	.68	.47	307

[a] 39% could not recall the season.

Note. Descriptive statistics are shown only for accidents as cases since transient variables are those current only at the time of an accident and are not measured for those who have no accidents.

Table B8

Study 2: Descriptive Statistics for Transient Personal Factors

Factor	M	SD	n
	Stressful Life Events at Time of Accident		
Divorce/Break-Up	.05	.21	253
Own Illness/Injury	.02	.15	253
Someone Close Died/Ill	.02	.15	253
Getting Married/Engaged	.05	.22	253
Expecting Baby/New Parent	.02	.15	253
Major Financial Problems	.04	.19	253
Loss of Job	.00	.06	253
Problems at Work/School	.08	.27	253
Moving/Changing Homes	.08	.26	253
Graduation School/College	.04	.20	253
Problems with Parents	.01	.11	253
Other	.17	.37	253
	Emotional State Before Accident		
Calm	.78	.42	235
Some Stress	.12	.32	235
Very Stressed	.03	.18	235
Fatigued	.07	.26	235
	Physical/Mental Conditions		
Average Hours of Sleep Per Night	2.56	.97	301
Sufficient Sleep Before The Accident	.83	.38	293

Table B8 (continued)

Study 2: Descriptive Statistics for Transient Personal Factors

Factor	M	SD	n
Safety Center or Self-Report of Alcohol or Drug Use Involved	.06	.25	296
Self-Reported Alcohol Use	.06	.24	251
Self-Reported Use of Medicine/Drug	.04	.20	250
Self-Report: Affected By Alcohol/Drug	.05	.22	248
Self-Report: Alcohol/Drug Contributed to the Accident	.04	.20	238
Rank at Time of Accident			
E1 or E2	.05	.22	309
E3	.13	.34	309
E4	.26	.44	309
E5	.21	.41	309
E6	.14	.34	309
E7 or E8	.04	.20	309
Marital Status at Time of Accident			
Single	.43	.50	251
Married	.50	.50	251
Separated	.02	.15	251
Divorced	.04	.21	251

Table B8 (continued)

Study 2: Descriptive Statistics for Transient Personal Factors

Factor	M	SD	n
	Other Transient Personal Characteristics		
Time Since Vehicle Training	2.57	1.07	248
Average Weekly Mileage	326.17	388.25	240
Years Driving at Time Of Accident	8.87	5.68	298
Age at Time of Accident (in months)	300.30	66.70	301

Note. Descriptive statistics are shown only for accidents as cases since transient variables are those current only at the time of an accident and are not measured for those who have no accidents.

Table B9

Study 2: Descriptive Statistics for Demographic Characteristics

Characteristic	All Accidents as Cases M	SD	n	All Individuals as Cases M	SD	n
Limitations/Disabilities						
Limited Physical Stamina	1.03	.25	307	1.03	.23	548
Upper Extremities Limited	1.02	.19	307	1.02	.20	548
Lower Extremities Limited	1.05	.30	307	1.04	.26	548
Hearing Limitation	1.01	.13	307	1.02	.18	548
Eyesight Limitation	1.08	.28	307	1.11	.32	548
Gender, Race, Age, and Rank						
Gender	.11	.31	307	.14	.35	548
White	.69	.46	309	.62	.49	551
Black	.19	.39	309	.25	.43	551
Other Race	.11	.32	309	.13	.35	551
Current Age	27.29	6.01	309	26.87	6.12	550
Current Rank	4.46	1.30	256	4.38	1.30	193
Current Years of Education	12.49	1.01	307	12.46	1.00	547
Current Years Driving Experience	11.13	6.19	306	10.45	6.36	542
MOS						
Driving MOS	.48	.50	309	.51	.50	551
Armored	.18	.39	309	.16	.37	551
Adjutant General	.03	.16	309	.03	.18	551
Aviation	.06	.23	309	.06	.23	551
Chemical	.03	.16	309	.04	.20	551
Electrical Maintenance	.04	.19	309	.05	.21	551

Table B9 (continued)

Study 2: Descriptive Statistics for Demographic Characteristics

	All Accidents as Cases			All Individuals as Cases		
Characteristic	M	SD	n	M	SD	n
Engineer	.08	.27	309	.10	.30	551
Field Artillery	.08	.28	309	.08	.27	551
Infantry	.09	.29	309	.09	.29	551
Mechanic	.10	.30	309	.09	.28	551
Medical	.05	.21	309	.03	.18	551
Military Police/Intelligence	.04	.19	309	.05	.22	551
Ordnance	.07	.25	309	.03	.16	551
Quartermaster	.11	.31	309	.13	.34	551
Signal Communication	.06	.23	309	.06	.23	551
Transportation	.05	.22	309	.07	.25	551

Table B10

Study 2: Correlations Among Accident Involvement Criteria

Variable	Accident Involvement Criteria						
	Severity	Injury	Total Cost	Work Days Lost	Self-Report Accidents	Safety Center Accidents	Total Accidents
Injury	.67**						
Total Cost	.41**	.17**					
Work Days Lost	.16**	.23**	.47**				
Self-Report Accidents	-.21**	-.16**	-.09	-.07			
Safety Center Accidents	.34**	.26**	.09	.11**	.27**		
Total Accidents	-.16**	-.13**	-.07	-.04	.93**	.50**	
Total At-Fault Accidents	-.09	-.09	-.03	-.05	.60**	.32**	.67**

Note. n=299-307 for correlations of the first four criteria with other criteria (measures of seriousness of accidents correlated with each other and with the number of accidents individuals in the sample had), and n=545-551 for correlations among the last four criteria (numbers of accidents individuals had correlated with one another). Numbers of accidents have been divided by the number of days soldiers could potentially have had an accident in the five-year period examined in this study.

*$p<.10$. **$p<.05$.

Table B11

Study 2: Correlations Between General Cognitive Aptitude Scale Scores (ASVAB Subtest Scores) and Accident Involvement Criteria

	Accident Involvement Criteria			
Aptitude Test	Severity	Injury	Total Cost	Work Days Lost
General Science	.00	-.00	-.11*	-.23**
Arithmetic Reasoning	-.10*	-.08	-.17**	-.27**
Word Knowledge	.02	-.00	-.07	-.25**
Paragraph Comprehension	.04	.02	-.08	-.25**
Numerical Operations	-.01	-.01	-.17**	-.28**
Coding Speed	.01	-.03	-.15**	-.27**
Auto/Shop Information	-.05	-.05	-.11*	-.20**
Mathematics Knowledge	-.05	-.01	-.13**	-.24**
Mechanical Comprehension	-.07	-.07	-.13**	-.22**
Electronics Information	.03	-.01	-.05	-.20**
Verbal	.03	.00	-.08	-.25**

Table B11 (continued)

Study 2: Correlations Between General Cognitive Aptitude Scale Scores (ASVAB Subtest Scores) and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
General Science	.11**	.05	.11**	.07
Arithmetic Reasoning	.14**	.06	.14**	.10**
Word Knowledge	.10**	.04	.09**	.09**
Paragraph Comprehension	.09**	.04	.08*	.05
Numerical Operations	.12**	.06	.11**	.07*
Coding Speed	.08*	.06	.08*	.05
Auto/Shop Information	.14**	.07*	.15**	.12**
Mathematics Knowledge	.13**	.06	.13**	.11**
Mechanical Comprehension	.15**	.07	.15**	.10**
Electronics Information	.11**	.07*	.12**	.08*
Verbal	.10**	.04	.09**	.09*

Note. n=299-305 for the Severity, Injury, Total Cost and Work Days Lost; n=541-547 for Self-Report, Safety Center, Total, and Total At-Fault Accidents.

*$p < .10$. **$p < .05$, two-tailed.

Table B12

Study 2: Correlations Between General Cognitive Aptitude (ASVAB Area) Composite Scores and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
General Technical	-.04	-.04	-.14**	-.25**
General Maintenance	-.03	-.03	-.11*	-.24**
Electrical	-.06	-.05	-.14**	-.24**
Clerical	-.04	-.04	-.16**	-.25**
Mechanical Maintenance	-.04	-.04	-.11*	-.24**
Signal Communication	-.06	-.05	-.14**	-.25**
Combat	-.06	-.06	-.12**	-.26**
Field Artillery	-.04	-.04	-.14**	-.26**
Operators/Food Service	-.03	-.03	-.12**	-.25**
Skilled/Technical	-.04	-.04	-.14**	-.25**
AFQT Scores	-.09	-.01	-.02	-.02

Table B12 (continued)

Study 2: Correlations Between General Cognitive Aptitude (ASVAB Area) Composite Scores and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
General Technical	.14**	.06	.14**	.10**
General Maintenance	.12**	.05	.12**	.10**
Electrical	.15**	.06	.15**	.11**
Clerical	.16**	.08*	.15**	.11**
Mechanical Maintenance	.12**	.06	.12**	.10**
Signal Communication	.13**	.05	.12**	.09**
Combat	.12**	.05	.12**	.10**
Field Artillery	.14**	.08*	.14**	.11**
Operators/Food Service	.12**	.06	.12**	.10**
Skilled/Technical	.16**	.06	.15**	.11**
AFQT	.07	-.03	.04	.03

Note. n=299-305 for the Severity, Injury, Total Cost and Work Days Lost; n=541-547 for Self-Report, Safety Center, Total, and Total At-Fault Accidents.

*$p < .10$. **$p < .05$, two-tailed.

Table B13

Study 2: Correlations Between Spatial Aptitude Scores and Accident Involvement Criteria

	Accident Involvement Criteria			
Aptitude Test	Severity	Injury	Total Cost	Work Days Lost
Map	-.09	-.02	-.09	-.00
Maze	-.03	-.07	-.05	-.01
Object Rotation	-.02	-.04	-.02	-.05
Orientation	-.10*	-.08	-.11*	-.07
Figural Reasoning	-.12**	-.05	-.06	-.00

Table B13 (continued)

Study 2: Correlations Between Spatial Aptitude Scores and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Map	.06	-.02	.05	.00
Maze	.09**	-.01	.09**	.04
Object Rotation	.11**	.04	.10**	.06
Orientation	.02	-.01	.02	.01
Figural Reasoning	.08*	.01	.06	.02

Note. n=299-305 for the Severity, Injury, Total Cost and Work Days Lost; n=543-549 for Self-Report, Safety Center, Total, and Total At-Fault Accidents.

*$p < .10$. **$p < .05$, two-tailed.

Table B14

Study 2: Correlations Between Waypoint Test Scores and Accident Involvement Criteria

Aptitude Test	Severity	Injury	Total Cost	Work Days Lost
	Accident Involvement Criteria			
Channel Capacity Score	-.01	-.04	-.07	.03
Channel Capacity (Norm Group)	.02	.01	-.06	.07
Waypoint Risk Group	.07	.18**	.03	.12**

Table B14 (continued)

Study 2: Correlations Between Waypoint Test Scores and Accident Involvement Criteria

Aptitude Test	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Channel Capacity Score	.00	-.05	-.02	-.04
Channel Capacity (Norm Group)	.00	-.05	-.03	-.05
Waypoint Risk Group	-.03	.08*	-.01	-.02

Note. n=291-304 for the Severity, Injury, Total Cost and Work Days Lost; n=534-539 for Self-Report, Safety Center, Total, and Total At-Fault Accidents.

*p < .10. **p < .05, two-tailed.

Table B15

Study 2: Correlations Between Temperament Measures and Accident Involvement Criteria

Measure	Accident Involvement Criteria: Severity	Injury	Total Cost	Work Days Lost
Type A Scale Scores[a]				
Impatience	-.08	-.02	-.08	-.03
Competitiveness	.00	.00	-.10	-.01
Irritability	.02	.05	-.04	-.06
Polyphasic Behavior	.00	-.02	.03	.00
Type A Total Scale	-.03	.02	-.08	-.03
AIM Scale Scores[b]				
Agreeableness	-.07	-.06	.00	.10
Dependability	-.02	-.01	-.02	.01
Dominance	.06	.05	-.04	-.02
Adjustment	-.01	-.04	-.04	.01
Work Orientation	-.01	-.10	-.01	-.05
Physical Condition	-.02	-.03	-.03	-.06
Adaptability	-.02	.00	-.03	.01
Social Desirability	.03	.09	-.05	-.03
Driving Related Locus of Control Scale Scores[a]				
Internal	-.02	-.02	.03	.00
External	-.08	-.02	-.07	-.03
Impulsivity Scale Scores[a]				
Restless	.00	-.03	-.02	-.01
Risk Taker	-.04	.03	-.07	.06
Lively	-.03	-.04	-.04	-.07

Table B15 (continued)

Study 2: Correlations Between Temperament Measures and Accident Involvement Criteria

Measure	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
	Accident Involvement Criteria			
		Type A Scale Scores		
Impatience	.04	-.05	.02	.05
Competitiveness	-.07	-.03	-.06	-.06
Irritability	.00	-.07	.00	-.01
Polyphasic Behavior	-.05	-.04	-.05	-.10
Type A Total Scale	-.02	-.07*	-.03	-.03
		AIM Scale Scores[c]		
Agreeableness	.00	-.03	-.02	-.08
Dependability	-.09**	.02	-.10**	-.08*
Dominance	-.01	.06	.01	.00
Adjustment	.05	.04	.05	.05
Work Orientation	-.01	.05	.00	.02
Physical Condition	.01	.02	.00	.00
Adaptability	-.02	.03	-.03	-.01
Social Desirability	-.07	.05	-.03	.02
		Driving Related Locus of Control Scale Scores		
Internal	-.05	-.02	-.05	-.04
External	.05	-.01	.04	.05
		Impulsivity Scale Scores		
Restless	.04	-.03	.04	.07*
Risk Taker	.02	-.09**	.01	.00
Lively	-.01	-.01	-.01	.03

Table B15 (continued)

Study 2: Correlations Between Temperament Measures and Accident Involvement Criteria

Measure	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
Impulsive	-.00	-.04	.04	.03
Impulsivity Total Scale	-.02	-.02	-.02	.02

Table B15 (continued)

Study 2: Correlations Between Temperament Measures and Accident Involvement Criteria

Measure	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Impulsive	.06	-.07	.04	.04
Impulsivity Total Scale	.05	-.07*	.04	.05

Note. n=524-547, unless otherwise noted.

[a]n=282-305. [b]n=264-287. [c]n = 478-521.

*p < .10. **p < .05, two-tailed.

Table B16

Study 2: Correlations Between Driver Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Severity	Injury	Total Cost	Work Days Lost
	Accident Involvement Criteria			
	Driver Judgment Scale Scores[a]			
Raw Scores: Speed Judgments	.05	-.02	.12*	.00
Raw Scores: Cause Judgments	.01	-.05	.00	-.08
Transformed Speed Score	-.01	-.05	.03	.04
Transformed Cause Score	.03	.01	.04	.01
	Driving Behaviors (Self)			
Drive Too Fast	-.12**	-.05	-.05	-.01
Forgetful Driver	-.04	.03	.04	.07
Drive to Feel Power/Speed	-.08	-.02	.02	.10*
Drink and Drive	-.06	-.04	-.03	-.04
Drive when Angry	-.11*	.04	-.06	-.01
Drive when Upset	-.03	.01	.00	.04
Drive when Sleepy	-.09	-.07	-.08	-.04
Risky Driver	-.07	-.03	.02	-.02
Drive Cautiously	-.01	.05	.04	-.02
Drive in Bad Weather Rather Than Miss a Social Event	-.09	.00	-.01	-.03
Confidence in Driving Ability	-.03	-.02	-.06	.03
	Driving History			
Number of Warnings	.01	.04	.07	.13**
Number of Tickets	-.13**	-.11*	.02	.02
Suspended License	-.13**	-.10*	-.01	.09
License Revoked	.00	.00	-.03	-.02

Table B16 (continued)

Study 2: Correlations Between Driver Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Driver Judgment Scale Scores[b]				
Raw Scores: Speed Judgments	.05	.03	.05	.17**
Raw Scores: Cause Judgments	.01	.03	.02	.05
Transformed Speed Score	-.07	-.04	-.06	.05
Transformed Cause Score	.00	.04	.02	-.01
Driving Behaviors (Self)				
Drive Too Fast	.00	-.08*	-.02	.02
Forgetful Driver	.01	-.04	-.01	.02
Drive to Feel Power/Speed	-.02	-.12**	-.04	-.02
Drink and Drive	-.02	-.11*	-.04	.01
Drive when Angry	.01	-.06	-.01	-.01
Drive when Upset	-.02	.10*	-.02	.00
Drive when Sleepy	.02	.01	.04	.05
Risky Driver	-.02	-.07	-.03	.02
Drive Cautiously	-.03	-.04	-.04	.06
Drive in Bad Weather Rather Than Miss a Social Event	.03	-.13**	.01	.04
Confidence in Driving Ability	-.06	-.03	-.06	-.05
Driving History				
Number of Warnings	-.01	.06	.02	-.03
Number of Tickets	.10**	.16**	.22**	.22**
Suspended License	-.02	.01	.02	.03
License Revoked	-.04	.01	-.01	.02

Table B16 (continued)

Study 2: Correlations Between Driver Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Accident Involvement Criteria: Severity	Injury	Total Cost	Work Days Lost
Scales on Beliefs about Army Discipline and Driving Laws				
Expect Strong Punishment	.00	.01	.03	.00
Offenses Forgotten Quickly	.07	.12**	.14**	.08
Punishment is Lax	.02	.09	-.03	.05
Punishment is Appropriate	.04	.03	.05	.04
Expect Serious Punishment For Military Vehicle Wreck	.05	-.01	.11*	-.01
Drinking and Driving Punishments are too Severe	-.01	-.06	.03	-.06
Government Should not Mandate Helmets, Air Bags, Seatbelts, etc.	-.05	.00	.02	-.02
Total Scale on Driving Law Severity	-.08	-.01	-.10*	-.06
Driving Anger Scale Scores				
Police Monitoring	-.13**	-.10	-.02	.01
Drivers' Rude Gestures	.02	.07	.04	.02
Drivers with High Beams	-.11	-.04	-.01	.03
Slow Drivers Blocking Traffic	-.10	-.02	-.04	-.02
Large Trucks	.00	-.01	-.04	-.03
Drivers Cut You Off	-.06	.02	-.08	.01
High Speed Drivers	.08	.10	.05	.07
Total Driving Anger Scale	-.06	.00	-.04	.01

Table B16 (continued)

Study 2: Correlations Between Driving Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Scales on Beliefs about Army Discipline and Driving Laws				
Expect Strong Punishment	-.06	-.12*	-.07	-.07
Offenses Forgotten Quickly	-.04	-.03	-.05	-.04
Punishment is Lax	-.05	.00	-.05	-.01
Punishment is Appropriate	-.09*	.01	-.08*	-.11*
Expect Serious Punishment For Military Vehicle Wreck	.01	-.02	.00	.03
Drinking and Driving Punishments are too Severe	-.03	-.07	-.05	-.02
Government Should not Mandate Helmets, Air Bags, Seatbelts, etc.	.03	-.03	.00	-.08*
Total Scale on Driving Law Severity	-.01	-.07	-.01	.00
Driving Anger Scale Scores				
Police Monitoring	-.02	-.06	-.02	.02
Drivers' Rude Gestures	.03	-.02	.01	-.01
Drivers with High Beams	.02	-.11**	-.01	.02
Slow Drivers Blocking Traffic	.03	-.11**	.00	.01
Large Trucks	.03	-.01	.02	.04
Drivers Cut You Off	.03	-.08*	.01	-.02
High Speed Drivers	-.01	.01	-.03	-.06
Total Driving Anger Scale	.03	-.08*	.00	.00

Table B16 (continued)

Study 2: Correlations Between Driver Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
	Driving Behaviors (Others)[c]			
Drive Too Fast	-.05	-.04	-.10	-.05
Forgetful Driver	-.12*	-.10	-.09	-.04
Drive to Feel Power/Speed	-.12*	-.08	-.08	.08
Drink and Drive	-.05	-.06	.02	.01
Drive when Angry	-.06	-.04	.02	-.02
Drive when Upset	-.04	.06	-.08	.00
Drive when Sleepy	-.08	.01	.00	-.02
Risky Driver	-.07	-.12*	-.01	-.02
Drive Cautiously	-.02	-.05	.04	.05
Drive in Bad Weather Rather Than Miss a Social Event	-.05	.04	-.04	-.03

Table B16 (continued)

Study 2: Correlations Between Driving Judgment, Behavior, History, and Attitude Variables and Accident Involvement Criteria

Measure	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
	Accident Involvement Criteria			
	Driving Behaviors (Others)			
Drive Too Fast	.03	.02	.03	.00
Forgetful Driver	.06	.01	.04	-.01
Drive to Feel Power/Speed	.02	.00	.02	-.03
Drink and Drive	.05	-.01	.03	.00
Drive when Angry	.04	.01	.03	-.02
Drive when Upset	-.05	-.07	-.04	-.04
Drive when Sleepy	.05	-.01	.04	.01
Risky Driver	.06	.01	.07	.02
Drive Cautiously	-.08*	-.06	-.07*	-.02
Drive in Bad Weather Rather Than Miss a Social Event	.01	-.02	.01	.05

Note. n=283-307 for Severity, Injury, Total Cost, and Work Days Lost, unless otherwise noted; n = 516-551 for Self Report, Safety Center, Total, and Total At-Fault Accidents, unless otherwise noted.

[a]n=237-244. [b]n=397-403. [c]n=226-250.

*p < .10. **p < .05, two-tailed.

Table B17

Study 2: Correlations Between Transient Situational Factors and Accident Involvement Criteria

Factor	Severity	Injury	Total Cost	Work Days Lost
	Accident Involvement Criteria			
Year of the Accident[a]	.02	.01	-.05	-.11
Weekend Night Hour[b]	-.07	-.03	.12**	.20**
Daylight[b]	.00	-.05	-.08	-.14**
On Post[b]	-.03	.00	-.02	-.01
On Duty[b]	.06	-.12**	-.08	-.12**
Environmental/Weather Prob.[c]	.13**	.10*	.02	.14**
Using Seatbelt[b]	-.12**	-.31**	-.07	-.25**
Familiarity with the Road[d]	.14**	.06	.05	-.02
Road Condition Contributed[d]	-.02	-.01	-.04	.02
Vehicle Condition Contributed[b]	-.14**	-.09	.14**	-.02
Number of Passengers[e]	.03	.10	.07	.04
Passengers Bothering Driver[e]	.01	-.05	.29**	.03
Driving Conditions and Driver Speed[b]				
Amount of Traffic	.12*	.02	.07	-.09
Speed of Traffic	.26**	.16**	.12*	.06
Driver Speed vs. Others	.03	.04	-.07	.05
Driver Speed vs. the Limit	.03	.08	-.04	.06
Type of Roadway[b]				
Road Speed	.11*	.12**	.07	.02
Highway Accident	-.41	-.04	.02	-.04
Street Accident	.14**	.11*	.05	.08
Country Road Accident	.00	.09	.02	-.02
Off-Road Accident	.04	-.04	-.04	-.01
Parking Lot/Building Accident	-.19**	-.20**	-.08	-.05

Table B17 (continued)

Study 2: Correlations Between Transient Situational Factors and Accident Involvement Criteria

Factor	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Time, Location, and Other Conditions at Time of Accident				
Year of Accident[f]	.05	.18*	-.04	-.07
Weekend Night Hour	.00	-.08	-.03	-.06
Daylight	.06	.07	.09	.04
On Post	-.16**	.09	-.07	.01
On Duty	-.19**	.34**	-.03	.02
Environmental/Weather Prob.	-.16**	.34**	-.07	-.01
Using Seatbelt	-.05	-.22**	-.11	-.08
Familiarity with the Road[g]	-.12	.11	-.12	.03
Road Conditions Contributed[g]	.04	-.09	.02	.06
Vehicle Condition Contributed[g]	.01	-.16**	-.03	.01
Number of Passengers[g]	.09	-.09	.07	.06
Passengers Bothering Driver[g]	.00	-.11	-.01	.12
Driving Conditions and Driver Speed[f]				
Amount of Traffic	-.06	.07	-.07	-.09
Speed of Traffic	-.13*	.18**	-.15**	-.12*
Driver Speed vs. Others	-.05	.07	-.05	-.17**
Driver Speed vs. the Limit	.15**	.08	.15*	.26**
Type of Roadway				
Road Speed	.01	-.08	-.06	-.10
Highway Accident	.02	-.25**	-.06	-.07
Street Accident	.03	.26**	.04	-.04
Country Road Accident	-.04	-.05	-.02	.02
Off-Road Accident	.05	-.01	.08	.12*
Parking Lot/Building Accident	-.02	-.11	.00	.03

Table B17 (continued)

Study 2: Correlations Between Transient Situational Factors and Accident Involvement Criteria

Factor	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
		Season of the Accident[a]		
Spring	-.12	-.11	-.09	-.11
Summer	-.04	-.09	.11	-.05
Autumn	.05	.04	.02	.10
Winter	.12*	.17**	-.05	.09
		Vehicle Type[b]		
Vehicle Size	.02	-.14**	.06	-.03
Motorcycle	.17**	.30**	.02	.14
Automobile	-.12**	-.06	-.09	-.12**
Small Truck	-.10*	-.08	.08	.14**
Jeep/Humvee	.06	.03	.00	-.03
Van	-.02	-.10*	-.04	-.03
Large Truck	.19**	.03	.08	-.05
Fighting Vehicle	-.02	.03	-.02	-.01
Other Army Vehicle	-.06	-.11*	-.04	-.03
Privately Owned Vehicle	-.11*	.09*	.01	.10*

Table B17 (continued)

Study 2: Correlations Between Transient Situational Factors and Accident Involvement Criteria

Factor	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
	Season of the Accident[f]			
Spring	-.05	-.07	-.06	-.05
Summer	-.01	.11	.03	.21**
Autumn	-.08	-.16*	-.11	-.07
Winter	.16*	.12	.16*	-.15*
	Vehicle Type			
Vehicle Size	-.10	.08	.00	.10
Motorcycle	-.07	.19**	-.06	-.09
Automobile	.14**	-.18**	.04	-.04
Small Truck	.05	-.21**	.01	-.01
Jeep/Humvee	-.09	.19**	-.01	.06
Van	.03	-.05	.02	-.02
Large Truck	-.17**	.25**	-.04	.07
Fighting Vehicle	-.08	.06	-.03	.03
Other Army Vehicle	.07	.00	.08	.05
Privately Owned Vehicle	.27**	-.57**	.06	-.04

Note. n = 225-236 unless otherwise noted.

[a]n=188, 39% could not recall the season. [b]n=300-307. [c]n=287-292. [d]n=244-251.
[e]n=228-247. [f]n = 130, 39% could not recall the season. [g]n = 172-186.

*p < .10. **p < .05, two-tailed.

Table B18

Study 2: Correlations Between Transient Personal Characteristics and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria: Severity	Injury	Total Cost	Work Days Lost
Stressful Life Events at Time of Accident[a]				
Divorce/Break Up	.14**	.02	.00	.16**
Own Illness/Injury	.07	.01	.26**	-.03
Someone Close Died/Ill	-.02	.07	-.04	-.04
Getting Married/Engaged	.05	.08	.00	-.05
Expecting Baby/New Parent	-.10	-.05	-.03	-.04
Major Financial Problems	.00	-.03	-.02	.00
Loss of Job	-.07	-.04	-.02	-.02
Problems at Work/School	-.08	-.07	-.06	-.06
Moving/Changing Homes	-.03	-.09	.04	-.04
Graduation School/College	-.13**	-.09	-.06	-.05
Problems with Parents	.03	.01	.00	.04
Other Major Life Events	.10	.13**	.01	.04
Emotional State Before Accident[b]				
Calm	-.05	-.08	.06	-.03
Some Stress	-.08	.03	-.07	-.01
Very Stressed	.06	.03	-.03	.00
Fatigued	.13**	.07	.02	.07
Physical/Mental Conditions[c]				
Average Hours of Sleep Per Night	.02	-.01	.01	-.06
Sufficient Sleep Before The Accident	.03	.03	-.08	.05

Table B18 (continued)

Study 2: Correlations Between Transient Personal Factors and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
	Stressful Life Events at Time of Accident[d]			
Divorce/Break Up	-.04	.05	-.05	-.01
Own Illness/Injury	-.01	-.04	-.02	.04
Someone Close Died/Ill	-.07	-.08	-.07	.01
Getting Married/Engaged	-.08	-.10	-.09	-.03
Expecting Baby/New Parent	-.01	-.08	-.02	-.02
Major Financial Problems	-.01	-.05	-.01	.02
Loss of Job	.00	-.05	.00	.00
Problems at Work/School	.03	.08	.01	-.03
Moving/Changing Homes	-.05	-.02	-.06	-.06
Graduation School/College	-.03	-.06	.00	.01
Problems with Parents	.07	-.03	.07	.03
Other Major Life Events	.36**	.19**	.35**	.38**
	Emotional State before Accident[e]			
Calm	-.13**	-.02	-.12*	-.19**
Some Stress	.07	-.05	.06	.12*
Very Stressed	.12*	.07	.13*	.14**
Fatigued	.04	.05	.04	.06
	Physical/Mental Conditions[f]			
Average Hours of Sleep[a] Per Night	.11*	-.01	.08	.06
Sufficient Sleep Before The Accident	-.24**	-.05	-.24**	-.26**

Table B18 (continued)

Study 2: Correlations Between Transient Personal Characteristics and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria: Severity	Injury	Total Cost	Work Days Lost
Safety Center Recorded Alcohol or Drug Use Involved	-.03	-.05	.11*	.01
Self-Reported Alcohol Use	-.04	-.09	.16**	.05
Self-Reported Use of Medicine/Drug	.00	.04	-.02	-.02
Self-Report: Affected By Alcohol/Drug	.02	-.03	.17**	-.05
Self-Report: Alcohol/Drug Contributed to the Accident	-.02	.00	-.03	-.04
Rank at Time of Accident[d]				
E1 or E2	.09	.09	.08	.23**
E3	.06	.13**	-.04	-.03
E4	.06	.07	.10*	-.01
E5	.04	-.03	.02	-.03
E6	.08	.00	-.02	-.01
E7 or E8	-.06	-.05	-.05	-.02
Rank (single ordinal variable)	-.07	-.14**	-.07	-.11*
Marital Status at Time of Accident[g]				
Single	-.06	.00	.06	-.07
Married	.02	.00	-.05	.10
Separated	.06	-.01	.01	-.05
Divorced	.04	.01	-.04	-.03

Table B18 (continued)

Study 2: Correlations Between Transient Personal Characteristics and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria: Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Safety Center Recorded Alcohol or Drug Use Involved	.35**	-.05	.35**	.41**
Self-Report Use of Medicine/Drug	.45**	.09	.44**	.52**
Self-Report Alcohol Use	.39**	.00	.38**	.44**
Self-Report: Affected By Alcohol/Drug	.46**	.01	.45**	.50**
Self-Report: Alcohol/Drug Contributed to the Accident	.49**	.05	.48**	.53**
Rank at Time of Accident[h]				
E1 or E2	-.09	-.05	-.09	-.04
E3	-.13**	.05	-.10*	-.04
E4	.22**	.01	.21**	.26**
E5	-.15**	.11*	-.13**	-.07
E6	-.02	.28**	.00	-.11*
E7 or E8	-.01	.02	-.01	-.08
Rank (as single ordinal variable)	.03	.18**	.02	-.11*
Marital Status at Time of Accident[i]				
Single	-.15**	-.34**	-.15**	-.06
Married	.16**	.26**	.16**	.08
Separated	.01	.16**	.01	-.01
Divorced	-.05	.07	-.05	-.04

Table B18 (continued)

Study 2: Correlations Between Transient Personal Characteristics and Accident Involvement Criteria

	Accident Involvement Criteria			
Characteristic	Severity	Injury	Total Cost	Work Days Lost
	Driving Experience and Exposure Factors[a]			
Time Since Vehicle Training	.00	-.14**	.06	-.04
Average Weekly Mileage	.01	-.05	.08	-.08
Years Driving at Time of Accident	.06	-.03	-.01	.03
Age at Time of Accident	.08	-.04	.04	.01

Table B18 (continued)

Study 2: Correlations Between Transient Personal Characteristics and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria			
	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
	Driving Experience and Exposure Factors			
Time Since Vehicle Training	.05	-.19**	.03	.06
Average Weekly Mileage	.21**	.19**	.21**	.11*
Years Driving at Time of Accident	-.01	.29**	.03**	.01
Age at Time of Accident	-.07	.23**	-.05	-.08

[a]n=245-251. [b]n=228-234. [c]n=232-299. [d]n=353. [e]n = 235. [f]n = 238-301. [g]n = 251.

*p<.10. **p<.05, two-tailed.

Table B19

Study 2: Correlations Between Demographic/Control Variables and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
Limitations/Disabilities				
Limited Physical Stamina	-.05	-.06	-.02	-.02
Upper Extremities	.08	.14	.00	.00
Lower Extremities	.05	.06	-.04	-.02
Hearing Limitations	.15**	.11*	.27**	.00
Eyesight Limitations	-.10*	.00	-.05	.02
Psychiatric Limitations	.07	.04	.02	.01
Demographics[a]				
Gender	.07	.08	-.03	-.04
White	-.08	-.06	.03	.06
Black	.12**	.14**	.03	-.03
Other Race	-.06	-.08	-.09	-.06
Current Age	.11*	.00	.06	.04
Current Rank	.09	-.01	-.01	-.03
Current Years of Education	.08	.01	.17**	-.02
Current Years Driving Experience	.08	.01	.01	.05
MOS				
Driving MOS	.00	.03	.06	-.04
Adjutant General	.10*	.06	-.02	-.01
Armored	-.10*	-.05	-.01	-.06
Aviation	.05	.00	.01	.02
Chemical	-.04	-.02	-.03	-.01
Electrical Maintenance	-.04	-.03	-.04	-.02

Table B19 (continued)

Study 2: Correlations Between Demographic/Control Variables and Accident Involvement Criteria

Characteristic	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
		Limitations/Disabilities		
Limited Physical Stamina	.01	-.03	-.01	-.06
Upper Extremities	-.06	-.03	-.07	.01
Lower Extremities	-.03	-.01	-.03	-.02
Hearing Limitations	-.09**	-.01	-.10**	-.02
Eyesight Limitations	-.07*	-.06	-.08*	-.05
		Demographics		
Gender	-.04	-.05	-.07	-.07
White	.10**	.04	.11**	.13**
Black	-.09**	-.02	-.09**	-.09**
Other Race	-.03	-.01	-.04	-.06
Current Age	-.04	.20**	.02	-.02
Current Rank	.02	.27**	.07*	.01
Current Years of Education	-.01	.06	.00	-.04
Current Years Driving Experience	-.02	.20**	.03	-.01
		MOS		
Driving MOS	-.03	.01	-.02	-.06
Armored	.07*	-.05	.05	.03
Adjutant General	-.03	-.06	-.05	-.09**
Aviation	.00	-.08*	-.02	-.02
Chemical	-.04	-.09**	-.06	-.04
Electrical Maintenance	-.01	-.06	-.03	-.01

Table B19 (continued)

Study 2: Correlations Between Demographic/Control Variables and Accident Involvement Criteria

Characteristic	Accident Involvement Criteria			
	Severity	Injury	Total Cost	Work Days Lost
Engineer	.03	.05	-.01	.00
Field Artillery	-.04	.01	-.05	.00
Infantry	-.03	-.06	.06	-.02
Mechanic	.06	.03	.06	.19**
Medical	.10*	.11	-.04	-.02
Military Police/Intelligence	.13**	.12**	.07	.02
Ordnance	-.09	-.13**	.00	-.04
Quartermaster	-.06	-.05	-.04	-.04
Signal Communication	-.04	.04	-.05	-.01
Transportation	.05	.03	.05	-.02

Table B19 (continued)

Study 2: Correlations Between Demographic/Control Variables and Accident Involvement Criteria

	Accident Involvement Criteria			
Characteristic	Self-Report Accidents	Safety Center Accidents	Total Accidents	Total At-Fault Accidents
Engineer	-.04	-.03	-.04	-.03
Field Artillery	.03	.05	.03	-.08*
Infantry	-.02	.05	.01	-.01
Mechanic	-.02	.00	.01	.05
Medical	.05	.12**	.04	.03
Military Police/Intelligence	-.07	-.01	-.08*	-.06
Ordnance	.16**	.04	.16**	.19**
Quartermaster	.01	-.02	.00	.04
Signal Communication	-.04	.01	-.02	-.01
Transportation	-.07	.04	-.04	-.03

Note. n=299-307 for Severity, Injury, Total Cost, and Work Days Lost, unless otherwise noted. n=537-551 for Self Report, Safety Center, Total, and Total At-Fault Accidents.

*$p < .10$. **$p < .05$, two-tailed.

Table B20

Study 2: Summary of Simultaneous Regression Analyses for General Cognitive Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
	Standardized ASVAB Subtest Scores							
General Science	-.005	(.01)	.003	(.03)	-478.99	(333.44)	-.098	(.25)
Arithmetic Reasoning	-.009	(.01)	-.021	(.02)	-386.89	(175.02)**	-.444	(.13)**
Word Knowledge	.021	(.03)	.034	(.06)	500.66	(838.09)	.036	(.63)
Paragraph Comprehension	.019	(.02)	.038	(.03)	268.56	(465.47)	-.110	(.35)
Numerical Operations	-.001	(.01)	.004	(.02)	-339.13	(292.43)	-.186	(.22)
Coding Speed	.013	(.01)	-.013	(.02)	-243.00	(262.70)	-.303	(.20)
Auto/Shop Information	-.012	(.01)	-.013	(.02)	-221.97	(260.68)	-.017	(.20)
Mathematics Knowledge	-.008	(.01)	-.014	(.02)	-14.97	(280.76)	.157	(.21)
Mechanical Comprehension	-.018	(.01)*	-.035	(.02)	-322.07	(289.76)	-.017	(.22)
Electronics Information	.025	(.01)**	.027	(.02)	669.36	(326.60)**	.193	(.25)
Verbal	-.017	(.04)	-.047	(.09)	-36.71	(1179.41)	-.164	(.89)
n	304		303		298		302	
Model R^2 or χ^2	.06		8.88		.07**		.13**	

Table B20 (continued)

Study 2: Summary of Simultaneous Regression Analyses for General Cognitive Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Standardized ASVAB Subtest Scores								
General Science	-.0000013	(.00)	-.0000003	(.00)	-.0000015	(.00)	-.0000058	(.00)*
Arithmetic Reasoning	.0000025	(.00)	.0000002	(.00)	.0000027	(.00)	.0000015	(.00)
Word Knowledge	-.0000028	(.00)	-.0000009	(.00)	-.0000037	(.00)	-.0000007	(.00)
Paragraph Comprehension	-.0000042	(.00)	-.0000009	(.00)	-.0000069	(.00)	-.0000097	(.00)**
Numerical Operations	.0000068	(.00)*	.0000005	(.00)	-.0000056	(.00)	.0000016	(.00)
Coding Speed	-.0000064	(.00)*	.0000010	(.00)	-.0000055	(.00)	-.0000030	(.00)
Auto/Shop Information	.0000049	(.00)	.0000013	(.00)	.0000057	(.00)*	.0000067	(.00)**
Mathematics Knowledge	.0000039	(.00)	.0000011	(.00)	.0000043	(.00)	.0000053	(.00)**
Mechanical Comprehension	.0000052	(.00)	.0000002	(.00)	.0000059	(.00)*	.0000000	(.00)
Electronics Information	-.0000035	(.00)	.0000017	(.00)	-.0000025	(.00)	-.0000035	(.00)
Verbal	-.0000011	(.00)	-.0000027	(.00)	.0000000	(.00)	.0000101	(.00)
n	546		546		546		546	
Model R^2	.05**		.01		.05**		.05**	

Table B20 (continued)

Study 2: Summary of Simultaneous Regression Analyses for General Cognitive Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
			ASVAB Area Composite Scores					
General Technical	.006	(.01)	-.003	(.03)	82.87	(342.29)	-.163	(.26)
General Maintenance	.015	(.01)	.033	(.03)	253.79	(409.93)	-.057	(.31)
Electrical	-.018	(.01)	-.025	(.03)	-506.95	(388.17)	.215	(.29)
Clerical	.008	(.01)	.013	(.02)	-167.59	(319.80)	.143	(.24)
Mechanical Maintenance	.008	(.02)	-.005	(.04)	677.08	(496.87)	.273	(.37)
Signal Communication	-.008	(.01)	-.011	(.02)	-104.57	(336.09)	-.171	(.25)
Combat	-.011	(.01)	-.030	(.02)	-123.90	(312.78)	-.284	(.23)
Field Artillery	-.001	(.01)	.010	(.03)	-103.20	(350.05)	-.175	(.26)
Operators/Food Service	-.002	(.01)	.014	(.03)	-518.59	(414.14)	.065	(.31)
Skilled/Technical	.004	(.01)	-.001	(.03)	291.71	(387.58)	-.218	(.29)
AFQT Scores	-.004	(.00)	.003	(.01)	63.14	(99.85)	.220	(.08)**
n	304		303		298		302	
Model R^2 or χ^2	.03		5.01		04		.10**	

Table B20 (continued)

Study 2: Summary of Simultaneous Regression Analyses for General Cognitive Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
	ASVAB Area Composites Scores							
General Technical	-.0000064	(.00)	-.0000003	(.00)	-.0000008	(.00)	-.0000024	(.00)
General Maintenance	.0000000	(.00)	.0000004	(.00)	-.0000009	(.00)	.0000030	(.00)
Electrical	-.0000016	(.00)	.0000009	(.00)	.0000004	(.00)	.0000007	(.00)
Clerical	.0000014	(.00)	.0000021	(.00)	.0000007	(.00)	.0000018	(.00)
Mechanical Maintenance	.0000034	(.00)	.0000011	(.00)	.0000044	(.00)	-.0000014	(.00)
Signal Communication	.0000018	(.00)	-.0000018	(.00)	-.0000007	(.00)	-.0000025	(.00)
Combat	-.0000039	(.00)	-.0000010	(.00)	-.0000038	(.00)	.0000009	(.00)
Field Artillery	.0000015	(.00)	.0000024	(.00)	.0000026	(.00)	.0000016	(.00)
Operators/Food Service	-.0000098	(.00)*	.0000013	(.00)	-.0000082	(.00)	-.0000009	(.00)
Skilled/Technical	.0000100	(.00)*	-.0000019	(.00)	.0000088	(.00)	.0000017	(.00)
AFQT Scores	.0000005	(.00)	-.0000008	(.00)	-.0000003	(.00)	.0000003	(.00)
n	540		540		540		534	
Model R^2	.04**		.02		.04**		.02	

*$p < .10$. **$p < .05$.

Table B21

Study 2: Summary of Simultaneous Regression Analyses for Spatial Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Severity		Injury		Total Cost		Work Days Lost	
	B	(SE B)	B	(SE B)	B	(SE B)	B	(SE B)
Map	-.005	(.01)	.018	(.03)	-344.85	(393.65)	-.02	(.31)
Maze	.005	(.01)	-.024	(.03)	-62.55	(451.52)	.02	(.35)
Object Rotation	.002	(.01)	-.002	(.02)	70.42	(258.66)	-.23	(.20)
Orientation	-.007	(.01)	-.006	(.02)	-389.42	(330.18)	-.36	(.25)
Reasoning	-.019	(.02)	-.008	(.04)	136.44	(497.04)	.75	(.39)*
n	305		303		299		303	
Model R^2 or χ^2	.02		2.90		.01		.02	

Table B21 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Spatial Aptitude Scores Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Map	-.0000003	(.00)	-.0000018	(.00)	-.0000004	(.00)	-.0000026	(.00)
Maze	.0000055	(.00)	-.0000008	(.00)	.0000058	(.00)	.0000021	(.00)
Object Rotation	.0000049	(.00)	.0000018	(.00)	.0000054	(.00)	.0000027	(.00)
Orientation	-.0000040	(.00)	-.0000009	(.00)	-.0000041	(.00)	-.0000004	(.00)
Reasoning	.0000052	(.00)	-.0000016	(.00)	.0000034	(.00)	.0000010	(.00)
n	547		547		547		541	
Model R^2	.02		.00		.01		.01	

*$p < .10$. **$p < .05$.

Table B22

Study 2: Summary of Simultaneous Regression Analyses for Waypoint Test Scores Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Channel Capacity Score	-.21	(.10)**	-.99	(.29)**	-4868.40	(3342.02)	-6.59	(2.55)**
Channel Capacity Norm Groups	.28	(.14)**	1.31	(.38)**	5393.45	(4480.45)	9.68	(3.43)**
Waypoint Risk Groups	.13	(.13)	.86	(.29)**	1109.63	(4089.85)	6.47	(3.10)**
n	295		294		290		293	
Model R^2 or χ^2	.02		22.26**		.01		.04**	

Table B22 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Waypoint Test Scores Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents		Safety Center Accidents		Total Accidents		Total At-Fault Accidents	
	B	(SE B)	B	(SE B)	B	(SE B)	B	(SE B)
Channel Capacity Score	.0000080	(.00)	.0000016	(.00)	.0000121	(.00)	.0000296	(.00)
Channel Capacity Norm Groups	-.0000107	(.00)	-.0000086	(.00)	-.0000227	(.00)	-.0000484	(.00)
Waypoint Risk Groups	-.0000229	(.00)	.0000429	(.00)*	.0000018	(.00)	-.0000056	(.00)
n	538		538		538		533	
Model R^2	.00		.01		.00		.01	

*$p < .10$. **$p < .05$.

Table B23

Study 2: Summary of Simultaneous Regression Analyses for Judgment and Temperament Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
			Type A Scale Scores					
Impatience	.02	(.24)	-.52	(.55)	90.83	(7776.36)	6.72	(6.01)
Competitiveness	.05	(.12)	-.17	(.27)	-2080.16	(3794.66)	-2.82	(2.96)
Irritability	.09	(.09)	-.06	(.21)	930.57	(2981.32)	-3.36	(2.33)
Polyphasic Behavior	.08	(.15)	-.36	(.34)	4974.71	(4880.62)	-3.06	(3.78)
Type A Total Scale	-.29	(.56)	1.18	(1.28)	-7585.98	(18210.94)	15.52	(14.07)
Internal Locus	.00	(.10)	-.14	(.22)	1904.52	(3172.03)	-.44	(2.49)
External Locus	-.11	(.10)	-.01	(.23)	-2877.47	(3222.74)	-.41	(2.52)
n	283		282		277		295	
Model R^2 or χ^2	.01		2.29		.03		.01	
			AIM Scale Scores					
Agreeableness	-.03	(.02)	-.05	(.05)	-847.23	(583.33)	-.31	(.18)*
Dependability	-.13	(.06)**	-.25	(.13)*	-2026.87	(1670.21)	-.22	(.52)
Dominance	.01	(.02)	.07	(.05)	-747.26	(578.57)	-.11	(.18)
Adjustment	-.12	(.06)	-.26	(.13)**	-2456.58	(1703.70)	-.05	(.53)
Work Orientation	.00	(.02)	-.08	(.05)*	593.61	(576.27)	.22	(.18)

Table B23 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Temperament Measures Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
			Type A Scale Scores					
Impatience	-.0000101	(.00)	.0000072	(.00)	.0000508	(.00)	.0000146	(.00)
Competitiveness	-.0000684	(.00)	-.0000110	(.00)	-.0000392	(.00)	-.0000497	(.00)
Irritability	-.0000250	(.00)	-.0000098	(.00)	-.0000013	(.00)	-.0000321	(.00)
Polyphasic Behavior	-.0000517	(.00)	-.0000022	(.00)	-.0000126	(.00)	-.0000721	(.00)
Type A Total Scale	.0001258	(.00)	-.0000097	(.00)	-.0000367	(.00)	.0001184	(.00)
Internal Locus	-.0000363	(.00)	-.0000021	(.00)	-.0000393	(.00)	-.0000308	(.00)
External Locus	.0000427	(.00)	.0000001	(.00)	.0000315	(.00)	.0000291	(.00)
n	516		516		516		510	
Model R^2	.02		.01		.01		.03**	
			AIM Scale Scores					
Agreeableness	.0000055	(.00)	-.0000099	(.00)**	.0000005	(.00)	-.0000084	(.00)*
Dependability	-.0000047	(.00)**	-.0000041	(.00)	.0000002	(.00)	-.0000059	(.00)
Dominance	.0000030	(.00)	.0000021	(.00)	.0000056	(.00)	.0000015	(.00)
Adjustment	.0000305	(.00)*	-.0000004	(.00)	.0000308	(.00)	.0000116	(.00)
Work Orientation	-.0000039	(.00)	.0000044	(.00)	-.0000026	(.00)	-.0000023	(.00)

Table B23 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Temperament Measures Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Physical Condition	.0000251	(.00)	-.0000076	(.00)	.0000206	(.00)	.0000053	(.00)
Adaptability	-.0000198	(.00)	.0000050	(.00)	-.0000175	(.00)	-.0000020	(.00)
Social Desirability	-.0000304	(.00)*	.0000150	(.00)	-.0000130	(.00)	.0000067	(.00)
n	468		468		468		464	
Model R^2	.03		.02		.03*		.03*	
Impulsivity Scale Scores								
Restless	.0000077	(.00)	-.0000034	(.00)	.0000198	(.00)	.0001240	(.00)**
Risk Taker	-.0000094	(.00)	-.0000249	(.00)	-.0000064	(.00)	.0000773	(.00)
Lively	-.0000041	(.00)	-.0000707	(.00)	.0000001	(.00)	.0001200	(.00)*
Impulsive	.0000255	(.00)	-.0000365	(.00)	.0000332	(.00)	.0002838	(.00)*
Impulsivity Total Scale	.0000031	(.00)	.0000450	(.00)	-.0000127	(.00)	-.0005610	(.00)*
n	543		543		543		538	
Model R^2	.00		.01		.00		.01	

* $p < .10$. *$p < .05$.

Table B24

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Driver Judgment Scale Scores								
Raw Scores: Speed Judgment	.05	(.04)	.04	(.09)	2908.92	(1317.41)**	.01	(.96)
Raw Scores: Accident Cause Judgment	-.02	(.05)	-.11	(.12)	-1729.43	(1745.98)	-1.82	(1.31)
Transformed Speed Score	-.30	(.38)	-.68	(.90)	10784.90	(12653.00)	6.61	(9.19)
Transformed Cause Score	.17	(.40)	.42	(.91)	12282.20	(13045.00)	6.38	(9.65)
n	242		241		236		285	
Model R^2 or χ^2	.01		1.32		.02		.01	
Driving Behaviors (Self)								
Drive Too Fast	-.10	(.11)	-.23	(.26)	-2124.32	(3399.19)	.42	(2.61)
Forgetful Driver	.07	(.13)	.37	(.30)	2666.97	(3976.28)	4.44	(3.05)
Drive to Feel Power/Speed	-.03	(.08)	-.18	(.18)	1594.95	(2340.84)	4.00	(1.80)**
Drink and Drive	-.01	(.07)	-.14	(.17)	-946.37	(2231.26)	-.70	(1.71)
Drive when Angry	-.06	(.08)	.24	(.17)	-3398.04	(2344.93)	-2.04	(1.80)
Drive when Upset	.04	(.05)	.10	(.11)	452.52	(1417.88)	.23	(1.09)

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Driver Judgment Scale Scores								
Raw Scores: Speed Judgment	.0000402	(.00)**	.0000091	(.00)	.0000453	(.00)**	.0000538	(.00)**
Raw Scores: Accident Cause Judgment	-.0000007	(.00)	.0000029	(.00)	-.0000003	(.00)	.0000596	(.00)
Transformed Speed Score	-.0003380	(.00)**	-.0000930	(.00)	-.0003630	(.00)**	-.0001550	(.00)
Transformed Cause Score	-.0000494	(.00)	.0000342	(.00)	-.0000104	(.00)	-.0001250	(.00)
n	398		398		397		395	
Model R^2	.02		.01		.02*		.05**	
Driving Behaviors (Self)								
Drive Too Fast	.0000078	(.00)	-.0000024	(.00)	-.0000021	(.00)	-.0000141	(.00)
Forgetful Driver	.0000194	(.00)	.0000021	(.00)	.0000001	(.00)	.0000128	(.00)
Drive to Feel Power/Speed	-.0000152	(.00)	-.0000186	(.00)	-.0000216	(.00)	-.0000089	(.00)
Drink and Drive	-.0000126	(.00)	-.0000178	(.00)	-.0000226	(.00)	-.0000023	(.00)
Drive when Angry	.0000140	(.00)	-.0000006	(.00)	.0000056	(.00)	-.0000161	(.00)
Drive when Upset	-.0000031	(.00)	-.0000065	(.00)	-.0000012	(.00)	-.0000065	(.00)

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Drive when Sleepy	-.05	(.06)	-.08	(.14)	-2501.19	(1864.22)	-1.53	(1.43)
Risky Driver	.05	(.14)	-.22	(.35)	4055.28	(4463.67)	-3.09	(3.43)
Drive Cautiously	.03	(.05)	.10	(.12)	824.95	(1662.79)	-1.02	(1.28)
Drive in Bad Weather Rather Than Miss a Social Event	-.03	(.04)	.08	(.10)	-92.45	(1389.97)	-.91	(1.07)
Confidence in Driving Ability	-.03	(.09)	-.01	(.21)	-1878.97	(2690.90)	1.56	(2.07)
Average Hours of Sleep	.00	(.06)	-.03	(.14)	76.19	(1844.85)	-1.66	(1.42)
n	297		290		292		296	
Model R^2 or χ^2	.03		6.77		.03		.04	
			Driving History					
Number of Warnings	.01	(.02)	.05	(.04)	608.49	(510.64)	.79	(.39)**
Number of Tickets	-.02	(.01)*	-.06	(.03)*	34.81	(393.59)	-.07	(.30)
Suspended License	-.39	(.16)**	-.81	(.43)*	-349.02	(5072.22)	6.52	(3.96)
License Revoked	.35	(.33)	.68	(.80)	-4824.53	(10574.02)	-8.71	(8.17)
n	304		303		298		302	
Model R^2 or χ^2	.04**		9.18*		.01		.03*	

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	Self-Report Accidents (SE B)	Safety Center Accidents B	Safety Center Accidents (SE B)	Total Accidents B	Total Accidents (SE B)	Total At-Fault Accidents B	Total At-Fault Accidents (SE B)
Drive when Sleepy	.0000019	(.00)	.0000210	(.00)*	.0000189	(.00)	.0000204	(.00)
Risky Driver	-.0000387	(.00)	.0000043	(.00)	-.0000137	(.00)	.0000087	(.00)
Drive Cautiously	-.0000113	(.00)	.0000530	(.00)	-.0000063	(.00)	.0000260	(.00)*
Drive in Bad Weather Rather Than Miss a Social Event	.0000203	(.00)	-.0000153	(.00)*	.0000150	(.00)	.0000098	(.00)
Confidence in Driving Ability	-.0000429	(.00)	-.0000112	(.00)	-.0000442	(.00)	-.0000235	(.00)
Average Hours of Sleep	-.0000142	(.00)	-.0000215	(.00)*	-.0000331	(.00)	-.0000074	(.00)
n	518		518		518		514	
Model R^2	.01		.04**		.01		.01	
			Driving History					
Number of Warnings	-.0000061	(.00)	.0000019	(.00)	-.0000028	(.00)	-.0000060	(.00)*
Number of Tickets	.0000324	(.00)**	.0000121	(.00)**	.0000355	(.00)*	.0000261	(.00)**
Suspended License	-.0000537	(.00)	-.0000244	(.00)	-.0000322	(.00)	-.0000155	(.00)
License Revoked	-.0001363	(.00)	.0000029	(.00)	-.0000793	(.00)	-.0000057	(.00)
n	546		546		546		554	
Model R^2	.05**		.03**		.05**		.06**	

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Scales on Beliefs about Army Discipline, Driving Laws, and Driving Anger								
Punishment is Lax	.02	(.06)	.24	(.16)	-75.99	(2055.83)	1.83	(1.60)
Punishment is Appropriate	.02	(.05)	.07	(.12)	558.07	(1686.62)	.88	(1.31)
Total Scale on Driving Law Severity	.02	(.08)	.22	(.18)	-2271.48	(2428.25)	-1.40	(1.89)
Police Monitoring	-.01	(.21)	-.36	(.46)	916.83	(6673.15)	-1.48	(5.18)
Drivers' Rude Gestures	.23	(.16)	.33	(.35)	2732.98	(10434.80)	-1.90	(4.08)
Drivers with High Beams	.01	(.13)	-.08	(.27)	822.35	(3990.60)	-.52	(3.10)
Slow Drivers Blocking Traffic	.10	(.40)	-.29	(.86)	-633.35	(12861.06)	-9.67	(9.99)
Large Trucks	.31	(.27)	-.01	(.58)	-3305.96	(8673.58)	-6.55	(6.74)
Drivers Cut You Off	.23	(.33)	.05	(.70)	-6672.15	(10434.80)	-4.93	(8.10)
High Speed Drivers	.34	(.21)	.51	(.45)	3970.74	(6709.33)	.74	(5.21)
Total Driving Anger Scale	-1.23	(1.51)	-.12	(3.18)	3052.71	(48306.68)	25.39	(37.52)
n	292		288		287		291	
Model R^2 or χ^2	.06		15.05		.03		.03	

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Scales on Beliefs about Army Discipline, Driving Laws, and Driving Anger								
Punishment is Lax	-.0000421	(.00)*	.0000026	(.00)	-.0000447	(.00)*	-.0000135	(.00)
Punishment is Appropriate	-.0000475	(.00)**	-.0000038	(.00)	-.0000487	(.00)**	-.0000428	(.00)**
Total Scale on Driving Law Severity	-.0000163	(.00)	-.0000052	(.00)	-.0000117	(.00)	-.0000135	(.00)
Police Monitoring	-.0000272	(.00)	.0000119	(.00)	-.0000008	(.00)	-.0000212	(.00)
Drivers' Rude Gestures	.0000333	(.00)	.0000125	(.00)	.0000404	(.00)	-.0000152	(.00)
Drivers with High Beams	.0000072	(.00)	-.0000190	(.00)	.0000056	(.00)	.0000022	(.00)
Slow Drivers Blocking Traffic	.0000653	(.00)	-.0000459	(.00)	.0000595	(.00)	-.0000322	(.00)
Large Trucks	.0000530	(.00)	.0000321	(.00)	.0000832	(.00)	.0000161	(.00)
Drivers Cut You Off	.0000474	(.00)	.0000121	(.00)	.0000826	(.00)	-.0000669	(.00)
High Speed Drivers	-.0000192	(.00)	.0000290	(.00)	-.0000101	(.00)	-.0000667	(.00)
Total Driving Anger Scale	-.0001632	(.00)	-.0000541	(.00)	-.0002859	(.00)	.0001562	(.00)
n	517		517		517		511	
Model R^2	.03		.03		.02		.03	

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
			Driving Behaviors (Others)					
Drive Too Fast	.16	(.11)	.13	(.25)	-8807.97	(3490.92)**	-5.48	(2.76)**
Forgetful Driver	-.01	(.10)	-.01	(.24)	-5878.33	(3242.08)*	-3.33	(2.54)
Drive to Feel Power/Speed	-.18	(.10)*	-.09	(.24)	-3883.27	(3219.66)	8.47	(2.56)**
Drink and Drive	.05	(.08)	-.25	(.17)	2730.97	(2343.15)	-.83	(1.85)
Drive when Angry	.06	(.09)	.18	(.21)	7682.72	(2907.49)**	-1.33	(2.27)
Drive when Upset	.03	(.06)	.11	(.14)	-3439.90	(1852.23)*	1.04	(1.44)
Drive when Sleepy	-.12	(.09)	.12	(.20)	2738.56	(2716.62)	1.77	(2.13)
Risky Driver	.00	(.11)	-.36	(.26)	5853.62	(3539.68)*	1.81	(2.79)
Drive Cautiously	-.07	(.06)	-.01	(.11)	1154.86	(1436.21)	.91	(1.13)
Drive in Bad Weather Rather Than Miss a Social Even	-.01	(.05)	.06	(.13)	-853.63	(1791.70)	-.22	(1.41)
n	291		290		286		289	
Model R^2 or χ^2	.03		7.67		.07**		.05	

*$p < .10$. **$p < .05$.

Table B24 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
			Driving Behaviors (Others)					
Drive Too Fast	.0000024	(.00)	.0000338	(.00)	.0000173	(.00)	.0000098	(.00)
Forgetful Driver	.0000167	(.00)	-.0000047	(.00)	.0000041	(.00)	-.0000097	(.00)
Drive to Feel Power/Speed	-.0000370	(.00)	-.0000094	(.00)	-.0000343	(.00)	-.0000307	(.00)
Drink and Drive	.0000318	(.00)	-.0000048	(.00)	.0000141	(.00)	-.0000058	(.00)
Drive when Angry	-.0000023	(.00)	-.0000070	(.00)	.0000099	(.00)	-.0000045	(.00)
Drive when Upset	-.0000173	(.00)	-.0000133	(.00)	-.0000229	(.00)	-.0000139	(.00)
Drive when Sleepy	.0000147	(.00)	.0000028	(.00)	.0000124	(.00)	.0000084	(.00)
Risky Driver	.0000371	(.00)	.0000066	(.00)	.0000583	(.00)	.0000287	(.00)
Drive Cautiously	-.0000397	(.00)**	-.0000073	(.00)	-.0000361	(.00)**	-.0000062	(.00)
Drive in Bad Weather Rather Than Miss a Social Event	-.0000089	(.00)	.0000016	(.00)	-.0000335	(.00)	.0000248	(.00)
n	509		509		509		503	
Model R^2	.02		.01		.02		.01	

*$p < .10$. **$p < .05$.

Table B25

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Time, Location, and Other Conditions at Time of Accident								
Weekend Night Hour	-.23	(.26)	1.73	(.86)**	10491.31	(8127.10)	13.53	(6.52)**
Daylight	.04	(.00)	-.69	(.51)	5026.00	(6016.32)	1.14	(4.83)
On Post	.03	(.00)	.54	(.47)	-1208.43	(4616.98)	1.94	(3.71)
On Duty	.02	(.00)	-.95	(.43)**	-5946.60	(4521.43)	-2.98	(3.63)
Environmental/Weather Problem	.24	(.14)	.61	(.39)	3985.77	(4343.80)	5.57	(3.49)
Using Seatbelt	-.35	(.17)**	-1.57	(.47)**	-7308.93	(5178.80)	-11.54	(4.16)**
Familiarity with the Road	.20	(.11)*	.40	(.30)	-2019.14	(3423.18)	-1.57	(2.75)
Road Condition	-.19	(.14)	-.17	(.41)	-6438.81	(4356.17)	-.38	(3.50)
Amount of Traffic	.09	(.08)	.15	(.24)	3893.93	(2511.22)	-1.91	(2.02)
Speed of Traffic	.28	(.08)**	.54	(.23)**	5390.27	(2397.66)**	1.91	(1.92)
Driver Speed vs. Other Traffic	-.11	(.07)	-.04	(.19)	-5458.71	(2050.73)**	1.59	(1.65)
Driver Speed vs. Speed Limit	.00	(.09)	-.03	(.25)	-2744.84	(2742.78)	-.21	(2.20)
Vehicle Condition	-.79	(.35)**	-.93	(1.38)	11742.63	(10855.12)	-6.35	(8.74)

Table B25 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents		Safety Center Accidents		Total Accidents		Total At-Fault Accidents	
	B	(SE B)	B	(SE B)	B	(SE B)	B	(SE B)
Time, Location, and Other Conditions at Time of Accident								
Weekend Night Hour	.000228	(.00)	-.000044	(.00)	.000214	(.00)	.000228	(.00)
Daylight	-.000080	(.00)	-.000012	(.00)	-.000077	(.00)	-.000028	(.00)
On Post	-.000295	(.00)**	-.000025	(.00)	-.000233	(.00)	-.000068	(.00)
On Duty	.000088	(.00)	.000204	(.00)**	.000194	(.00)	.000089	(.00)
Environmental/Weather Problem	-.000336	(.00)**	.000200	(.00)**	-.000209	(.00)	-.000227	(.00)*
Using Seatbelt	-.000496	(.00)**	-.000160	(.00)**	-.000574	(.00)	-.000625	(.00)
Familiarity with the Road	-.000176	(.00)*	.000036	(.00)	-.000183	(.00)	-.000143	(.00)
Road Condition	-.000016	(.00)	-.000150	(.00)**	-.000085	(.00)	.000006	(.00)
Amount of Traffic	-.000011	(.00)	.000022	(.00)**	.000004	(.00)	.000007	(.00)
Speed of Traffic	-.000072	(.00)	.000018	(.00)**	-.000094	(.00)	-.000095	(.00)
Driver Speed vs. Other Traffic	-.000002	(.00)	-.000009	(.00)	.000007	(.00)	-.000023	(.00)*
Driver Speed vs. Speed Limit	.000107	(.00)**	.000031	(.00)	.000111	(.00)**	.000178	(.00)**
Vehicle Condition	.000557	(.00)*	-.000170	(.00)	.000417	(.00)	.000453	(.00)

Table B25 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Vehicle Size	.00	(.09)	-.28	(.29)	2615.03	(2641.45)	-.10	(2.12)
Number of Passengers	.02	(.06)	.38	(.19)**	-2135.82	(1990.68)	-.73	(1.60)
Passengers Bothering Driver	.16	(.42)	-7.04	(17.24)	55566.88	(12990.65)**	6.30	(10.43)
n	217		205		217		217	
Model R^2 or χ^2	.17**		47.54**		.17**		.12**	
Type of Roadway[a]								
Highway Accident	-.22	(.19)	-.48	(.46)	804.80	(6126.04)	-3.98	(4.75)
Country Road Accident	-.09	(.17)	.34	(.38)	437.20	(5446.36)	-2.44	(4.22)
Off-Road Accident	-.30	(.31)	-.73	(.81)	-7419.29	(10033.51)	-2.64	(7.77)
Parking Lot/Building Accident	-.66	(.19)**	-2.77	(1.02)**	-7634.38	(5927.95)	-4.88	(4.59)
n	306		305		300		304	
Model R^2 or χ^2	.04**		20.02**		.01		.01	

Table B25 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	Self-Report Accidents (SE B)	Safety Center Accidents B	Safety Center Accidents (SE B)	Total Accidents B	Total Accidents (SE B)	Total At-Fault Accidents B	Total At-Fault Accidents (SE B)
Vehicle Size	.000138*	(.00)	-.000023	(.00)	.000152	(.00)	.000228	(.00)**
Number of Passengers	.000047	(.00)	-.000005	(.00)	.000039	(.00)	.000031	(.00)
Passengers Bothering Driver	-.000376	(.00)	-.000057	(.00)	-.000226	(.00)	-.000016	(.00)**
n	217		217		217		217	
Model R^2	.17**		.32**		.16**		.18**	
			Type of Roadway[a]					
Highway Accident	.000179	(.00)	-.000242	(.00)**	.000065	(.00)	.000065	(.00)
Country Road Accident	-.000063	(.00)	-.000005	(.00)	.000032	(.00)	.000033	(.00)
Off-Road Accident	-.000066	(.00)	-.000042	(.00)	.000041	(.00)	.000041	(.00)
Parking Lot/Building Accident	-.000140	(.00)	-.000171	(.00)**	-.000139	(.00)	-.000139	(.00)
n	308		308		308		308	
Model R^2	.01		.07**		.00		.00	

Table B25 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
			Vehicle Type Driven at the Time of the Accident[b]					
Motorcycle	.63	(.35)*	3.81	(1.23)**	1442.58	(11111.08)	13.58	(8.54)
Automobile	-.15	(.27)	.31	(.69)	-2967.14	(8702.87)	-1.98	(6.69)
Small Truck	-.25	(.29)	.00	(.74)	4923.81	(9335.17)	7.42	(7.14)
Jeep/Humvee	.14	(.32)	.66	(.79)	-94.73	(10361.13)	-2.03	(7.96)
Van	-.16	(.38)	-1.20	(1.24)	-6928.35	(12145.20)	-2.96	(9.33)
Large Truck	.58	(.32)*	.66	(.79)	7097.53	(10361.13)	-3.42	(7.96)
Fighting Vehicle	-.25	(.69)	1.10	(1.56)	-7863.17	(22222.15)	-3.42	(17.08)
n	306		305		300		304	
Model R^2 or χ^2	.08**		33.19**		.02		.05**	

Table B25 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Situational Factors Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Vehicle Type Driven at the Time of the Accident[b]								
Motorcycle	-.00011	(.00)	.00012	(.00)	-.00019	(.00)	-.00035	(.00)
Automobile	.00010	(.00)	-.00016	(.00)	-.00005	(.00)	-.00020	(.00)
Small Truck	.00009	(.00)	-.00024	(.00)**	-.00006	(.00)	-.00019	(.00)
Jeep/Humvee	-.00016	(.00)	.00010	(.00)	-.00008	(.00)	-.00008	(.00)
Van	.00010	(.00)	-.00017	(.00)	-.00002	(.00)	-.00022	(.00)
Large Truck	-.00026	(.00)	.00013	(.00)	-.00014	(.00)	-.00008	(.00)
Fighting Vehicle	-.00006	(.00)	.00016	(.00)	-.00030	(.00)	.00001	(.00)
n	235		235		235		235	
Model R^2	.06*		.18**		.01		.02	

[a]Reference category is Street. [b]Reference category is Other Army Vehicle; there were no cases involving buses in these analyses.

* $p < .10$. ** $p < .05$.

Table B26

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Divorce/Break-Up	.84	(.35)**	.02	(.99)	7149.90	(10721.88)	28.77	(8.53)**
Own Illness/Injury	.63	(.46)	1.83	(1.23)	53732.54	(13984.68)**	2.64	(11.13)
Someone Close Died/Ill	-.11	(.43)	-.29	(1.24)	-3436.19	(12960.80)	-4.64	(10.31)
Getting Married/Engaged	.32	(.31)	.94	(.71)	537.33	(9291.33)	-5.98	(7.39)
Expecting Baby/New Parent	-.55	(.42)	-.30	(1.27)	-4744.81	(12844.24)	-7.03	(10.22)
Major Financial Problems	-.08	(.42)	.27	(1.05)	-12983.60	(12631.24)	5.95	(10.05)
Loss of Job	-.72	(1.15)	-2.09	(22.31)	-30146.60	(34955.35)	1.57	(27.81)
Problems at Work/School	-.57	(.26)**	-1.79	(.99)*	-15076.20	(7898.65)*	-5.65	(6.28)
Moving/Changing Homes	-.16	(.26)	-1.29	(1.00)	10845.08	(7918.86)	-7.54	(6.30)
Graduation School/College	-.52	(.34)	-1.03	(1.27)	-13903.20	(10224.35)	-4.59	(8.13)
Problems with Parents	.20	(.66)	1.79	(1.71)	-11920.90	(19993.27)	11.92	(15.91)*
Other Major Life Events	.33	(.18)	.55	(.52)	-2959.47	(5526.74)	5.89	(4.40)
Emotional State Before Accident[a]								
Some Stress	-.23	(.20)	.49	(.56)	-4528.66	(6155.20)	-3.36	(4.90)
Very Stressed	.21	(.38)	.73	(1.03)	-13405.20	(11470.64)	.15	(9.13)
Fatigued	.65	(.28)**	1.49	(.77)*	-4789.59	(8422.58)	10.46	(6.70)

Table B26 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	Self-Report Accidents (SE B)	Safety Center Accidents B	Safety Center Accidents (SE B)	Total Accidents B	Total Accidents (SE B)	Total At-Fault Accidents B	Total At-Fault Accidents (SE B)
Divorce/Break-Up	-.000316	(.00)	-.000069	(.00)	-.000333	(.00)	.000119	(.00)
Own Illness/Injury	-.000324	(.00)	-.000033	(.00)	-.000368	(.00)	.000327	(.00)
Someone Close Died/Ill	-.000023	(.00)	-.000098	(.00)	-.000107	(.00)	.000206	(.00)
Getting Married/Engaged	-.000208	(.00)	-.000092	(.00)	-.000272	(.00)	-.000057	(.00)
Expecting Baby/New Parent	-.000456	(.00)	-.000205	(.00)	-.000461	(.00)	-.000428	(.00)
Major Financial Problems	-.000132	(.00)	.000041	(.00)	-.000007	(.00)	.000045	(.00)
Loss of Job	-.000943	(.00)	-.000223	(.00)	-.000990	(.00)	-.000775	(.00)
Problems at Work/School	-.000053	(.00)	-.000007	(.00)	-.000124	(.00)	-.000351	(.00)*
Moving/Changing Homes	-.000200	(.00)	-.000127	(.00)	-.000216	(.00)	-.000067	(.00)
Graduation School/College	-.000015	(.00)	.000076	(.00)	.000148	(.00)	.000275	(.00)
Problems with Parents	.000179	(.00)	.000095	(.00)	.000216	(.00)	-.000359	(.00)
Other Major Life Events	.000371	(.00)**	.000115	(.00)**	.000340	(.00)**	.000392	(.00)**
Emotional Stress Before Accident[a]								
Some Stress	.000258	(.00)*	-.000045	(.00)	.000204	(.00)	.000378	(.00)**
Very Stressed	.000027	(.00)	.000007	(.00)	.000041	(.00)	.000178	(.00)
Fatigued	-.000374	(.00)*	.000006	(.00)	-.000386	(.00)*	-.000320	(.00)

Table B26 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement

Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Sufficient Sleep	.33	(.20)*	.25	(.55)	-1862.71	(5920.20)	6.64	(4.71)
Affected by Alcohol/Drug	-.10	(.36)	-.19	(.95)	21794.34	(10832.56)**	-10.89	(8.62)
Rank at Time of Accident[b]								
E1 or E2	.67	(.31)**	1.99	(.87)**	15000.86	(9259.89)	28.00	(7.37)**
E3	.32	(.21)	.93	(.55)*	-2615.49	(6502.61)	1.83	(5.17)
E5	.05	(.21)	.28	(.60)	-3626.24	(6446.61)	-2.03	(5.13)
E6	.09	(.28)	1.16	(.77)	-8385.70	(8512.29)	-6.13	(6.77)
E7 or E8	-.19	(.42)	-.29	(1.38)	-18292.20	(12700.71)	-2.54	(10.10)
Marital Status[c]								
Married	-.01	(.16)	.06	(.47)	-8270.07	(4929.59)*	7.00	(3.92)*
Separated	-.51	(.51)	.77	(1.29)	-20494.10	(15423.15)	-17.94	(12.27)
Divorced	.09	(.34)	.26	(.87)	-7488.69	(10356.83)	-7.12	(8.24)

Table B26 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement

Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Sufficient Sleep	-.000322	(.00)**	-.000049	(.00)	-.000317	(.00)**	-.000321	(.00)**
Use of Alcohol	.000157	(.00)	-.000099	(.00)	.000198	(.00)	.000480	(.00)*
Use of Medicine/Drug	.000684	(.00)	-.000002	(.00)	.000664	(.00)	.001616	(.00)**
Affected by Alcohol/Drug	.000746	(.00)	-.000146	(.00)	.000592	(.00)	.000166	(.00)
Alcohol/DrugContributed To Accidents	.000435	(.00)	.000318	(.00)	.000496	(.00)	.000226	(.00)
Rank at Time of Accident[b]								
E1 or E2	-.000417	(.00)*	.000135	(.00)	-.000303	(.00)	-.000206	(.00)
E3	-.000373	(.00)**	.000164	(.00)**	-.000218	(.00)	-.000077	(.00)
E5	-.000380	(.00)**	.000136	(.00)**	-.000296	(.00)*	-.000177	(.00)
E6	-.000239	(.00)	.000293	(.00)**	-.000131	(.00)	-.000449	(.00)**
E7 or E8	-.000156	(.00)	.000166	(.00)	-.000102	(.00)	-.000607	(.00)**
Marital Status[c]								
Married	.000373	(.00)**	.000149	(.00)**	.000330	(.00)**	.000180	(.00)
Separated	.000492	(.00)	.000313	(.00)**	.000381	(.00)	-.000014	(.00)
Divorced	.000332	(.00)	.000261	(.00)**	.000306	(.00)	.000033	(.00)

Table B26 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Average Weekly Mileage Driven	.00	(.00)	.00	(.00)	13.20	(5.64)**	.00	(.00)
Time Since Vehicle Training	-.01	(.06)	-.36	(.18)**	-644.87	(1883.58)	-.48	(1.50)
Years Driving Experience At Time of Accidents	-.02	(.04)	.00	(.14)	-2936.15	(1200.98)**	.30	(.96)
Age at Time of Accident	.00	(.00)	.00	(.01)	330.89	(111.41)**	-.01	(.09)
n	222		200		222		222	
Model R^2 or χ^2	.17(.04)		35.19		.21(.09)		.18(.05)*	

Table B26 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Transient Personal Characteristics Predicting Accident Involvement

Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Time Since Vehicle Training	.000002	(.00)	-.000046	(.00)**	-.000012	(.00)	-.000003	(.00)
Average Weekly Mileage Driven	.000001	(.00)**	.000000	(.00)	.000001	(.00)**	.000001	(.00)*
Years Driving Experience At Time of Accidents	.000051	(.00)*	-.000015	(.00)	.000034	(.00)	.000060	(.00)**
Age at Time of Accident	-.000006	(.00)**	.000001	(.00)	-.000044	(.00)	-.000005	(.00)*
n	220		220		220		220	
Model R^2	.48**		.32**		.45**		.50**	

[a]Reference category is Calm. [b]Reference category is E4. [c]Reference category is Single.

*$p < .10$. **$p < .05$.

Table B27

Study 2: Summary of Simultaneous Regression Analyses for Demographic Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Demographics/Controls								
Limited Physical Stamina	-.11	(.23)	-4.97	(14.27)	1205.58	(6901.32)	-1.14	(5.79)
Upper Extremities Limitation	.25	(.30)	13.11	(29.49)	-5075.23	(9124.14)	-.59	(7.65)
Lower Extremities Limitation	.04	(.19)	-.04	(.47)	-4963.57	(5635.83)	-2.96	(4.72)
Hearing Limitation	.99	(.49)**	1.91	(1.28)	64007.89	(14606.93)**	-3.02	(12.24)
Eyesight Limitation	-.36	(.20)*	.12	(.48)	-4405.16	(6004.71)	.20	(5.03)
Psychiatric Limitation	.40	(1.16)	-3.16	(65.72)	-23790.40	(34756.77)	12.99	(29.13)
Gender	.28	(.18)	.61	(.42)	-1153.04	(5323.32)	-1.60	(4.46)
Race[a]								
Black	.20	(.15)	.90	(.36)**	299.76	(4430.39)	-.96	(3.71)
Other Race	-.21	(.19)	-.27	(.52)	-11757.60	(5594.69)**	-3.41	(4.68)
Current Age	.06	(.04)*	-.09	(.09)	3904.56	(1117.70)**	.16	(.94)
Current Rank	.00	(.07)	-.18	(.17)	-2807.83	(2053.64)	-2.14	(1.72)
Current Years of Education	-.02	(.06)	-.10	(.15)	3888.00	(1840.66)**	-.39	(1.54)
Current Years Driving Experience	-.05	(.03)	.11	(.09)	-3519.86	(1011.99)**	.40	(1.85)

Table B27

Study 2: Summary of Simultaneous Regression Analyses for Demographic/Control Variables Predicting Accident Involvement

Criteria

Predictor Variable	Self-Report Accidents B	Self-Report Accidents (SE B)	Safety Center Accidents B	Safety Center Accidents (SE B)	Total Accidents B	Total Accidents (SE B)	Total At-Fault Accidents B	Total At-Fault Accidents (SE B)
Demographic/Control Variables								
Limited Physical Stamina	.000143	(.00)	-.000015	(.00)	.000116	(.00)	-.000077	(.00)
Upper Extremities Limitation	-.000032	(.00)	-.000053	(.00)	-.000064	(.00)	.000011	(.00)
Lower Extremities Limitation	.000014	(.00)	-.000018	(.00)	.000015	(.00)	-.000037	(.00)
Hearing Limitation	-.000055	(.00)	-.000049	(.00)	-.000116	(.00)	-.000049	(.00)
Eyesight Limitation	-.000059	(.00)	-.000016	(.00)	-.000054	(.00)	-.000063	(.00)
Gender	-.000024	(.00)	-.000006	(.00)	-.000051	(.00)	-.000071	(.00)
Race[a]								
Black	-.000099	(.00)**	-.000029	(.00)	-.000116	(.00)*	-.000087	(.00)**
Other Race	-.000070	(.00)	-.000033	(.00)	-.000101	(.00)	-.000090	(.00)*
Current Age	-.000025	(.00)**	-.000001	(.00)	-.000021	(.00)	-.000005	(.00)
Current Rank	.000033	(.00)	.000048	(.00)**	.000051	(.00)**	.000011	(.00)
Current Years of Education	.000005	(.00)	-.000010	(.00)	-.000004	(.00)	-.000010	(.00)**
Current Years Driving Experience	.000018	(.00)*	.000001	(.00)	.000016	(.00)	.000002	(.00)

Table B27 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Demographic Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Driving MOS	.13	(.12)	.70	(.28)**	4518.88	(3460.75)	-.36	(.72)
n	300		294		295		299	
Model R^2 or χ^2	.07**		28.06**		.16**		.02	
MOS[b]								
Armored	-.35	(.21)*	-.37	(.48)	2448.89	(6625.08)	-.03	(.09)
Aviation	.01	(.29)	-.10	(.65)	3905.99	(9081.66)	-.19	(.13)
Chemical	-.38	(.38)	-.33	(.94)	-3598.87	(11929.39)	-.36	(.17)**
Electrical Maintenance	-.44	(.34)	-.86	(.81)	-6793.97	(11047.03)	-.29	(.15)*
Engineer	.08	(.28)	.56	(.64)	3349.56	(8953.40)	.02	(.13)
Field Artillery	-.13	(.22)	.19	(.51)	-3334.55	(7083.20)	-.04	(.10)
Infantry	-.28	(.25)	-.51	(.61)	7562.34	(8085.87)	-.14	(.12)
Mechanic	-.02	(.25)	.10	(.57)	7301.41	(8085.87)	.01	(.11)
Medical	.26	(.31)	.88	(.69)	-3452.36	(10044.25)	.00	(.14)
Military Police/Intelligence	.44	(.33)	1.15	(.76)	13176.42	(10627.20)	-.22	(.15)
Ordnance	-.48	(.28)*	-1.60	(.86)*	2696.38	(8814.19)	-.11	(.13)
Quartermaster	-.35	(.25)	-.39	(.58)	-1274.97	(7792.23)	-.07	(.11)

Table B27 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Demographic/Control Variables Predicting Accident Involvement

Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Driving MOS	-.000061	(.00)	-.000012	(.00)	-.000066	(.00)	-.000067	(.00)**
n	532		532		532		532	
Model R^2	.10**		.08**		.09**		.04	
			MOS[b]					
Armored	.000051	(.00)	-.000082	(.00)**	.000040	(.00)	.000113	(.00)*
Aviation	-.000023	(.00)	-.000123	(.00)**	-.000055	(.00)	.000032	(.00)
Chemical	-.000116	(.00)	-.000152	(.00)**	-.000166	(.00)	.000007	(.00)
Electrical Maintenance	.000006	(.00)	-.000080	(.00)	-.000035	(.00)	.000039	(.00)
Engineer	-.000086	(.00)	-.000038	(.00)	-.000070	(.00)	.000019	(.00)
Field Artillery	-.000005	(.00)	-.000032	(.00)	.000016	(.00)	-.000081	(.00)
Infantry	-.000057	(.00)	-.000006	(.00)	-.000004	(.00)	.000050	(.00)
Mechanic	-.000060	(.00)	-.000048	(.00)	-.000007	(.00)	.000122	(.00)
Medical	.000093	(.00)	.000110	(.00)	.000090	(.00)	.000120	(.00)
Military Police/Intelligence	-.000170	(.00)	-.000055	(.00)	-.000180	(.00)	-.000025	(.00)
Ordnance	-.000425	(.00)**	.000009	(.00)	.000452	(.00)**	.000470	(.00)**

Table B27 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Demographic Characteristics Predicting Accident Involvement Criteria

Predictor Variable	Severity B	Severity (SE B)	Injury B	Injury (SE B)	Total Cost B	Total Cost (SE B)	Work Days Lost B	Work Days Lost (SE B)
Signal Communication	-.32	(.29)	.23	(.65)	-3304.44	(9405.32)	-.15	(.13)
Transportation	.02	(.30)	.19	(.68)	8274.54	(9594.27)	-.06	(.14)
n	306		305		300		308	
Model R^2 or χ^2	.07		18.90		.02		.05	

Table B27 (continued)

Study 2: Summary of Simultaneous Regression Analyses for Demographic/Control Variables Predicting Accident Involvement Criteria

Predictor Variable	Self-Report Accidents B	(SE B)	Safety Center Accidents B	(SE B)	Total Accidents B	(SE B)	Total At-Fault Accidents B	(SE B)
Quartermaster	-.000024	(.00)	-.000158	(.00)	-.000011	(.00)	.000099	(.00)
Signal Communication	-.000113	(.00)	-.000132	(.00)	-.000056	(.00)	.000055	(.00)
Transportation	-.000144	(.00)	-.000011	(.00)	-.000089	(.00)	.000031	(.00)
n	550		550		550		544	
Model R^2	.05**		.05**		.04*		.06**	

[a]The reference category is White.

[b]The reference category for MOS is Adjutant General.

*$p < .10$. **$p < .05$.

Table B28

Study 2: Event History Analysis Using ASVAB Scores to Predict Number of Accidents

Predictor	Estimate	SE
	Standardized ASVAB Subtest Scores	
General Science	.021	.02
Arithmetic Reasoning	.013	.01
Word Knowledge	-.006	.02
Paragraph Comprehension	-.008	.02
Numerical Operations	.010	.01
Coding Speed	-.018*	.01
Auto/Shop Information	.012	.01
Mathematics Knowledge	.003	.01
Mechanical Comprehension	.026**	.01
Electronics Information	-.013	.01
Verbal	-.021	.03
	ASVAB Composite Scores	
General Technical	-.008	.01
General Maintenance	-.004	.01
Electrical	.002	.01
Clerical	.001	.01
Mechanical Maintenance	.017	.02
Signal Communication	-.007	.01
Combat	-.010	.01
Field Artillery	.012	.01
Operators/Food Service	-.011	.02
Skilled/Technical	.016	.02
AFQT Scores	-.000	.00

*$p < .10$. **$p < .05$, two-sided.

Table B29

Study 2: Event History Analysis Using Spatial Aptitude Test Scores Predicting Number of Accidents

Predictor	Estimate	SE
Map	-.009	.01
Maze	.001	.01
Object Rotation	.018	.01
Orientation	-.012	.01
Figural Reasoning	.027	.02

*p < .10. **p < .05, two-sided.

Table B30

Study 2: Event History Analysis Using Waypoint Test Scores Predicting Number of Accidents

Predictor	Estimate	SE
	Waypoint Risk Score Alone	
Waypoint Risk Score	.094	.13
	Waypoint and Channel Capacity Scores	
Channel Capacity Score	.820	.04
Channel Capacity (Norm Group)	-.064	.15
Waypoint Risk Score	.020	.15

*p < .10. **p < .05, two-sided.

Table B31

Study 2: Event History Analyses for Temperament Measures Predicting Number of Accidents

Predictor	Estimate	SE
Driver Locus of Control and Type A Scale Scores		
Impatience	.111	.11
Competitiveness	-.113	.07
Irritability	.016	.06
Polyphasic Behavior	-.010	.08
Internal Locus of Control	-.117	.09
External Locus of Control	.116	.09
AIM Scale Scores		
Agreeableness	-.023	.02
Dependability	-.019	.05
Dominance	.003	.02
Adjustment	.057	.05
Work Orientation	.013	.02
Physical Condition	.020	.06
Adaptability	-.016	.05
Social Desirability	-.014	.06
Driving Anger and Impulsivity Scale Scores		
Restless	-.022	.08
Risk Taker	-.020	.07
Impulsive	.160	.11
Total Driving Anger Score	-.088	.09

*$p < .10$. **$p < .05$, two-sided.

Table B32

Study 2: Event History Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Number of Accidents

Predictor	Estimate	SE
Driver Judgment Raw Scores		
Raw Scores: Speed Judgments	.037	.03
Raw Scores: Cause Judgments	-.020	.05
Driver Judgment Transformed Scores		
Transformed Speed Score	-.168	.28
Transformed Cause Score	.255	.39
Driving Behaviors (Self)		
Drive Too Fast	.129	.10
Forgetful Driver	.081	.13
Drive to Feel Power/Speed	-.029	.08
Drink and Drive	-.209**	.09
Drive when Angry	.051	.08
Drive when Upset	.020	.05
Drive when Sleepy	.009	.06
Risky Driver	-.173	.14
Drive Cautiously	-.006	.05
Drive in Bad Weather Rather Than Miss a Social Event	-.071	.06
Confidence in Driving Ability	-.205	.09
Average Hours of Sleep Per Night	-.106	.07

Table B32 (continued)

Study 2: Event History Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Number of Accidents

Predictor	Estimate	SE
	Driving History	
Number of Tickets	.060**	.01
Suspended License	-.136	.16
	Scales on Beliefs About Army Discipline	
Punishment is Lax	-.077	.07
Punishment is Appropriate	-.064	.06
	Other Scales on Beliefs About Army Discipline	
Offenses Forgotten Quickly	-.001	.06
Expect Serious Punishment For Military Vehicle Wreck	-.005	.05
	Driving Anger Scale Scores	
Total Scale on Driving Law Severity	-.056	.07
Police Monitoring	.001	.07
Drivers' Rude Gestures	.038	.07
Drivers with High Beams	-.089	.08
Slow Drivers Blocking Traffic	.107	.13
Drivers Cut You Off	.092	.13
High Speed Drivers	-.171	.12
Gender (F=1/M=0)	.184	.18

Table B32 (continued)

Study 2: Event History Analyses for Driving Judgment, Behavior, History, and Attitude Variables Predicting Number of Accidents

Predictor	Estimate	SE
	Driving Behaviors (Others)	
Drive Too Fast	.118	.11
Forgetful Driver	.019	.10
Drive to Feel Power/Speed	-.129	.09
Drink and Drive	.043	.08
Drive when Angry	-.053	.10
Drive when Upset	.046	.06
Drive when Sleepy	.008	.08
Risky Driver	.128	.11
Drive Cautiously	-.112*	.05
Drive in Bad Weather Rather Than Miss a Social Event	-.012	.06

*p < .10. **p < .05.

Table B33

Study 2: Event History Analyses for Demographic/Control Variables Predicting Number of Accidents

Predictor	Estimate	SE
	Limitations/Disabilities	
Eyesight Limitations	-3.624**	.14
	MOS	
Armored	-2.300**	.22
Aviation	-.339	.30
Chemical	-4.570**	.28
Electrical Maintenance	-3.957**	.25
Engineer	-.378	.28
Field Artillery	-.181	.27
Infantry	-.237	.26
Mechanic	-.255	.27
Medical	-2.178**	.26
Military Police/Intelligence	-4.193**	.26
Ordnance	.412	.34
Quartermaster	-2.392	.23
Signal Communication	-.339	.32
Transportation	-.172	.30

Note. The reference category for MOS is "Adjutant General."

*$p < .10$. **$p < .05$.

Table B34

Study 2: Final Simultaneous Regression Analysis for Predicting Accident Severity

Variable	B	SE B	β
	Selection Variables Only		
ASVAB Standard Score: Electronics Information	.02	.01	.28**
ASVAB Standard Score: Mechanical Comprehension	-.02	.01	-.28**
Suspended License	-.30	.14	-.12**
Hearing Limitation	1.08	.41	.15**
Rank E1 or E2	.52	.24	.12**
Rank E3	.28	.16	.10*
Rank E5	.23	.14	.10*
Rank E6	.31	.16	.12*
Rank E7 or E8	-.19	.26	-.04
R^2	.10**		
	Selection and Transient Variables Combined		
ASVAB Standard Score: Electronics Information	.02	.01	.23**
ASVAB Mechanical Comprehension	-.02	.01	-.19*
Suspended License	-.37	.16	-.14**
Hearing Limitation	1.09	.40	.17**
E1 or E2	.32	.27	.07
Rank E3	.30	.18	.11*
Rank E5	.22	.15	.09
Rank E6	.43	.18	.15**
Rank E7 or E8	-.10	.28	-.02
Using a Seatbelt	-.25	.15	-.10*
Speed of Traffic	.22	.06	.23**

Table B34 (continued)

Study 2: Final Simultaneous Regression Analysis for Predicting Accident Severity

Variable	B	SE B	β
Divorce/Breakup	.60	.26	.14**
R^2	.16**		

Note. The first model was calculated based on the maximum sample possible for variables included (n = 272). The second model was calculated with a smaller sample (n = 206) because of missing data for some individuals on variables included in it.

*p < .10. **p < .05.

Table B35

Study 2: Final Logistic Regression Model Predicting Accident Injury

Variable	B	(SE B)	$r_{partial}$	e^B
Selection Variables Only				
Waypoint Risk Score	.90	(.32)**	.13	2.46
AIM Scale Score: Work Orientation	-.08	(.03)**	-.10	.93
Believe Offenses Forgotten Quickly in Army	.29	(.13)**	.09	1.33
Police Monitoring Makes Angry	-.45	(.18)**	-.11	.64
Angry at High Speed Drivers	.51	(.23)**	.09	1.67
Selection and Transient Variables Combined				
Waypoint Risk Score	.84	(.41)**	.09	2.32
AIM Scale Score: Work Orientation	-.08	(.04)*	-.07	.93
Police Monitoring Makes Angry	-.54	(.25)**	-.10	.58
Angry at High Speed Drivers	.64	(.30)**	.10	1.89
Using a Seatbelt	-2.37	(.48)**	-.29	.09
Speed of Traffic	.49	(.18)**	.15	1.63
Getting Married/Engaged	1.32	(.71)*	.07	3.73
Other Stressful Events	.93	(.51)*	.07	2.54
Training on this Vehicle	-.40	(.17)**	-.11	.67

Note. The first model was calculated based on the maximum sample possible for variables included (n = 275). The second model was calculated with a smaller sample (n = 224) because of missing data for some individuals on variables included in it.

*$p < .10$. **$p < .05$.

Table B36

Study 2: Final Simultaneous Regression Analysis for Predicting Total Cost of the Accident

Variable	B	SE B	β
	Selection Variables Only		
ASVAB Standard Score: Arithmetic Reasoning	-342.13	149.79	-.13**
Hearing Limitation	57236.85	12565.74	.26**
Believe Offenses Forgotten Quickly in Army	3421.32	1558.55	.12**
R^2	.11**		
	Selection and Transient Variables Combined		
Hearing Limitation	38652.41	12092.10	.20**
Believe Offenses Forgotten Quickly in Army	3920.46	1723.06	.14**
Vehicle Condition	20739.66	9470.28	.13**
Safety Center Recorded Alcohol Use	18931.76	7727.26	.15**
Own-Illness/Injury	27766.49	11133.92	.16**
Speed of Traffic	4463.45	1879.27	.15**
Passengers Bothering Driver	42695.20	13623.71	.20**
R^2	.25**		

Note. The first model was calculated based on the maximum sample possible for variables included ($n = 289$). The second model was calculated with a smaller sample ($n = 220$) because of missing data for some individuals on variables that were included in it.

*$p < .10$. **$p < .05$.

Table B37

Study 2: Final Simultaneous Regression Analysis for Predicting Work Days Lost

Variable	B	SE B	β
Selection Variables Only			
ASVAB Standard Score: Arithmetic Reasoning	-.41	.09	-.25**
ASVAB Standard Score: Mechanical Comprehension	9.86	4.49	.12**
Waypoint Risk	6.31	2.96	.12**
Rank E1 or E2	19.77	5.98	.19**
Rank E4	2.49	3.27	.05
Rank E5	.52	3.47	.01
Rank E6	3.43	4.00	.05
Rank E7 or E8	-3.01	6.39	-.03
R^2	.15**		
Selection and Transient Variables Combined			
ASVAB Standard Score: Arithmetic Reasoning	-.46	.09	-.28**
Waypoint Risk	6.61	3.06	.12**
Rank E1 or E2	22.67	5.94	.22**
Rank E4	-.46	3.38	-.01
Rank E5	1.44	3.60	.03
Rank E6	1.76	4.17	.03
Rank E7 or E8	-1.82	6.55	-.02
Small Truck	9.72	3.36	.17**
Using a Seatbelt	-12.72	3.24	-.22**

Table B37 (continued)

Study 2: Final Simultaneous Regression Analysis for Predicting Work Days Lost

Weekend Night Hour	12.52	4.32	.16**
Divorce/Breakup	19.21	6.01	.18**
R^2	.28**		

Note. The first model was calculated based on the maximum sample possible for variables included (n = 301). The second model was calculated with a smaller sample (n = 247) because of missing data for some individuals on variables included in it.

*p < .10. **p < .05.

Table B38

Study 2: Final Simultaneous Regression Model Predicting Self-Report Accidents Per Day

Predictor	B	(SE B)	β
ASVAB Standard Score: Mechanical Comprehension	.000004	(.00)	.14**
Number of Tickets	.000028	(.00)	.19**
R^2	.06**		

Note. n = 542.

*p < .10. **p < .05.

Table B39

Study 2: Final Simultaneous Regression Model Predicting Safety Center Accidents Per Day

Predictor	B	(SE B)	β
Waypoint Risk Score	.0000421	(.00)	.07*
Number of Tickets	.0000121	(.00)	.17**
Average Hours of Sleep at Night	-.0000223	(.00)	-.09**
Drive in Bad Weather Rather than Miss a Social Event	-.0000167	(.00)**	-.10**
Angry at Slow Drivers Blocking Traffic	-.0000395	(.00)**	-.12**
R^2	.07**		

Note. n =520.

*p < .10. **p < .05.

Table B40

Study 2: Final Simultaneous Regression Model Predicting Total Accidents Per Day

Predictor	B	(SE B)	β
Number of Tickets	.000028	(.00)**	.19**
Punishment is Appropriate	-.000036	(.00)**	-.08**
R^2	.05**		

Note. n = 526.

*p < .10. **p < .05.

Table B41

Study 2: Final Simultaneous Regression Model Predicting Total At-Fault Accidents Per Day

Predictor[a]	B	(SE B)	β
Raw Score: Speed Judgement	.0000284	(.00)	.14**
Number of Tickets	.0000327	(.00)	.26**
Punishment is Appropriate	-.0000492	(.00)	-.14**
Government Should not Mandate Safety Equipment	-.0000463	(.00)	-.16**
R^2	.12**		

Note. n = 381.

*p < .10. **p < .05.